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9. ACTIVITY FACTORS

9.1 INTRODUCTION

As a consequence of a child's immaturity and small stature, certain activities and behaviors specific to children place them at higher risk to certain environmental agents (Chance and Harmsen, 1998). Individual or group activities are important determinants of potential exposure because toxic chemicals introduced into the environment may not cause harm a child until an activity is performed subjecting the child to contact with those contaminants. An activity or time spent will vary based on, for example, culture, hobbies, location, gender, age, and personal preferences. It is difficult to accurately collect/record data for a child's activity patterns (Hubal et al., 1999). Children engage in more contact activities than adults, therefore, a much wider distribution of activities need to be considered when assessing exposure (Hubal et al., 2000). Behavioral patterns and preferred activities results in different exposures than for adults, but also for children of different developmental stages (Chance and Harmsen, 1998).

The purpose of this section is to provide information on various activities, length of time spent performing these activities, and locations and length of time spent by individuals within those various microenvironments. This section summarizes data on how much time children spend participating in various activities, in various microenvironments, and on the frequency of performing various activities. These data cover a wide scope of activities and populations arranged by age group, when available.

9.2 ACTIVITY PATTERNS

The purpose of this section is to describe published time use studies that provide information on time-activity patterns of children in the U.S. These studies are briefly described below. For a detailed description of the studies, the reader is referred to the Exposure Factors Handbook, Volume III (U.S. EPA, 1997).

Timmer et al. (1985) - How Children Use Time - Timmer et al. (1985) conducted a study using the data obtained on children's time use from a 1981-1982 Panel study. A total of 922 children participated in the survey. The children surveyed were between the ages of 3 and 17 years using a time diary and a standardized interview. The time diary involved children reporting their activities beginning at 12.00 a.m. the previous night; the duration and location of each

activity; the presence of another individual; and whether they were performing other activities at the same time. The standardized interview administered to the children was to gather information about their psychological, intellectual (using reading comprehension tests), and emotional well-being; their hopes and goals; their family environment; and their attitudes and beliefs.

The mean time spent performing major activities on weekdays and weekends by age and sex, and type of day is presented in Table 9-1. On weekdays, children spend about 40 percent of their time sleeping, 20 percent in school, and 10 percent eating, washing, dressing, and performing other personal activities (Timmer et al., 1985). The data in Table 9-1 indicate that girls spend more time than boys performing household work and personal care activities, and less time playing sports. Also, children spend most of their free time watching television. Table 9-2 presents the mean time children spend during weekdays and weekends performing major activities by five different age groups. Also, the significant effects of each variable (i.e., age, sex) are shown in Table 9-2. Older children spend more time performing household and market work, studying and watching television, and less time eating, sleeping, and playing. Timmer et al. (1985) estimated that on the average, boys spend 19.4 hours a week watching television and girls spend 17.8 hours per week performing the same activity.

A limitation associated with this study is that it was conducted in 1981 and there is a potential that activity patterns in children may have changed significantly from 1981 to the present. Thus, application of these data for current exposure assessment may bias exposure assessment results. Another limitation is that the data do not provide overall annual estimates of children's time use since data were collected only during the time of the year when children attend school and not during school vacation.

EPA estimated the total time indoors and outdoors using the Timmer data. Activities performed indoors were assumed to include household work, personal care, eating, sleeping, school, studying, attending church, watching television, and engaging in household conversations. The average times spent in these indoor activities, and half the time spent in each activity which could have occurred indoors or outdoors (i.e., market work, sports, hobbies, art activities, playing, reading, and other passive leisure) were summed. Table 9-3 summarizes the results of this analysis by age groups and day of the week.

Robinson and Thomas (1991) - Time Spent in Activities, Locations, and Microenvironments: A California-National Comparison - Robinson and Thomas (1991)

reviewed and compared data from the 1987-88 California Air Resources Board (CARB) time activity study for California residents and from a similar 1985 national study, *American's Use of Time*. Both studies used the diary approach data. Time use patterns were collected for individuals 12 years and older. Telephone interviews based on the random-digit-dialing procedure were conducted for approximately 1,762 respondents. Data categorized for children 0-18 years old were not provided in the study. In addition, Robinson and Thomas (1991) defined a set of 16 microenvironments based on the activity and location codes employed in both studies. The mean duration of time spent for the total sample population, 12 years and older in three location categories is presented in Table 9-4 for both studies. Based on the data shown in Table 9-4, respondents spent most of their time indoors, 1255 and 1279 minutes/day for the CARB and national study, respectively.

Table 9-5 presents the mean duration of time and standard mean error for the 16 microenvironments grouped by total sample population and gender. Also included is the mean time spent for respondents ("Doers") who reported participating in each activity. Table 9-5 shows that in both studies males spend more time in work locations, automobiles and other vehicles, autoplaces (garages), and physical outdoor activities, outdoor sites. In contrast, females spend more time cooking, engaging in other kitchen activities, performing other chores, and shopping. The same trends also occur on a per participant basis.

Table 9-6 shows the mean time spent in various microenvironments grouped by type of day (weekday or weekend) in both studies. Generally, respondents spent most of their time during the weekends in restaurants/bars (CARB study), motor vehicles, outdoor activities, social-cultural settings, leisure/communication activities, and sleeping. Microenvironmental differences by age are presented in Table 9-7.

Limitations associated with the Robinson and Thomas (1991) study are that the CARB survey was performed in California only. Therefore, if applied to other populations, the data set may be biased. In addition, the studies were conducted in 1980s and may bias exposure assessment results when used for current exposure assessments. Another limitation is that time distribution patterns were not provided for both studies and the data are based on short-term studies.

Wiley et al. (1991) - Study of Children's Activity Patterns - The California children's activity pattern survey design provided time estimates of children (under 12 years old) in various

activities and locations (microenvironments) on a typical day (Wiley et al., 1991). A total of 1,200 children were included in the study. The average time respondents spent during the 10 activity categories for all children are presented in Table 9-8. Also included in this table are the detailed activity, including its code, with the highest mean duration of time; the percentage of respondents who reported participating in any activity (percent doing); and the mean, median, and maximum time duration for "doers." The dominant activity category, personal care (night sleep being the highest contributor), had the highest time expenditure of 794 mins/day (13.2 hours/day). All respondents reported sleeping at night, resulting in a mean daily time per participant of 794 mins/day spent sleeping. The activity category "don't know" had a duration of about 2 mins/day and only 4 percent of the respondents reported missing activity time.

Table 9-9 presents the mean time spent in the 10 activity categories by age and gender. Differences in activity patterns for boys and girls tended to be small. Table 9-10 presents the mean time spent in the 10 activity categories grouped by seasons and California regions. There were seasonal differences for 5 activity categories: personal care, educational activities, social/entertainment, recreation, and communication/ passive leisure. Time expenditure differences in various regions of the State were minimal for childcare, work-related activities, shopping, personal care, education, social life, and recreation.

Table 9-11 presents the distribution of time across six location categories. The participation rates (percent) of respondents, the mean, median, and maximum time for "doers." The detailed location with the highest average time expenditure are also shown. The largest amount of time spent was at home (1,078 minutes/day); 99 percent of respondents spent time at home (1,086 minutes/ participant/day). Tables 9-12 and 9-13 show the average time spent in the six locations grouped by age and gender, and season and region, respectively. There are age differences in time expenditure in educational settings for boys and girls (Table 9-12). There are no differences in time expenditure at the six locations by regions, and time spent in school decreased in the summer months compared to other seasons (Table 9-13). Table 9-14 shows the average potential exposure time children spent in proximity to tobacco smoke, gasoline fumes, and gas oven fumes grouped by age and gender. The sampled children spent more time closer to tobacco smoke (77 mins/day) than gasoline fumes (2 mins/day) and gas oven fumes (11 mins/day).

EPA estimated the total time indoors and outdoors using the data from the Wiley study. Activities performed indoors, were assumed to include household, childcare, personal needs and care, education, and communication and passive leisure. The average times spent in these indoor activities, and half the time spent in each activity which could have occurred indoors or outdoors (i.e., work-related, goods/services, organizational activities, entertainment/social, don't know/not coded) were summed. Table 9-15 summarizes the results of this analysis by age groups.

U.S. EPA (1992) - Dermal Exposure Assessment: Principles and Applications - U.S. EPA (1992) addressed the variables of exposure time, frequency, and duration needed to calculate dermal exposure as related to activity. The reader is referred to the document for a detailed discussion of these variables in relation to soil and water related activities. The suggested values that can be used for dermal exposure are presented in Table 9-16. Limitations of this study are that the values are based on small data sets and a limited number of studies. These data are not representative for children in specific age group categories. An advantage is that it presents default values for frequency and duration for use in exposure assessments when specific data are not available.

Davis (1995), Soil Ingestion in Children with Pica (Final Report), EPA Cooperative Agreement CR 816334-01 - In 1992, the Fred Hutchinson Cancer Research Center under Cooperative Agreement with EPA conducted a study to estimate soil intake rates and collect mouthing behavior data. Originally, the study was designed with two primary purposes: 1) to describe and quantify the distribution of soil ingestion values in a group of children under the age of five who exhibit behaviors that would be likely to result in the ingestion of larger than normal amounts of soil; and 2) to assess and quantify the degree to which soil ingestion varies among children according to season of the year (summer vs. winter).

The study was conducted during the first four months of 1992 and included 92 children from the Tri-Cities area in Washington State. Children ranged in age from 10 to 60 months. These children were volunteers among a group selected through random digit dialing. The study was conducted during a period of 7 days.

In addition to mouthing behavior data, information was collected about how long the child spent indoors and outdoors each day, and the general types of outdoor settings the child played in. Figure 9-1 presents the distribution of the number of hours per day study children spent indoors at home. Values were: the mean was 8.9 hours, the median was 9 hours, and the range

was 30 minutes to 1.5 hours. Figure 9-2 presents the distribution of the number of hours per day study children spent indoors away from home. The mean number of hours spent indoors away from home was 1.8, the median was 1, and the range was 0-15 hours. Figure 9-3 presents the distribution of number of hours per day study children spent outdoors at home. The mean number of hours spent outdoors at home was 1.4, the median was 45 minutes, and the range was 0-9 hours. Figure 9-4 presents the number of hours per day study children spent outdoors away from home. The mean number of hours spent was approximately 30 minutes, the median was less than 15 minutes, and the range was 0-8 hours.

Tsang and Klepeis (1996) - National Human Activity Pattern Survey (NHAPS) - The National Human Activity Pattern Survey was conducted by the U.S. EPA (Tsang and Klepeis, 1996). It is the largest and most current human activity pattern survey available (Tsang and Klepeis, 1996). Data were collected on duration and frequency of selected activities and of the time spent in selected microenvironments. In addition, demographic information was collected for each respondent to allow for statistical summaries to be generated according to specific subgroups of the U.S. population (i.e., by gender, age, race, employment status, census region, season, etc.). The participants' responses were weighted according to geographic, socioeconomic, time/season, and other demographic factors to ensure that results were representative of the U.S. population.

Tables 9-17 through 9-47 provide data from the NHAPS study. Tables 9-17 through 9-31 present data on the amount of time spent in selected activities and/or the corresponding distribution data, when available.

- **Table 9-17** presents number of times taking a shower at specified daily frequencies by number of respondents. The data shows that the majority of respondents take a shower one or two times a day.

- **Table 9-18** provides time spent taking a shower and time spent in the shower room immediately after showering. Most of the respondents spent 10-20 minutes taking a shower and in the shower room after showering.

- **Table 9-19** provides the percentile data for the same activity shown in Table 9-16. The 50th percentile value is 10 minutes for showering and 5 minutes for time spent after showering was complete. The 90th percentile values vary across age groups and range from 30-35 minutes and 10-15 minutes for time spent showering and in the bathroom after showering, respectively.

- **Table 9-20** presents total time (minutes) spent in the shower or bathtub and in the bathroom immediately after a shower or bath. The majority of respondents spent from 10-20 minutes in the shower or bathtub and approximately 10 minutes in the bathroom afterwards.

- **Table 9-21** presents the percentile data for the same activity shown in Table 9-18. The 50th percentile values range from 15-20 minutes and 2-5 minutes for taking a shower or bath and time spent in the bathroom after the bath, respectively.

- **Table 9-22** provides a range of number of times washing the hands in a day. Most respondents washed their hands 3-5 times a day.

- **Table 9-23** presents statistics data for the number of minutes per day spent working or being near excessive dust in the air. For age groups 1-11 years old, the 50th percentile data indicates that approximately 75 minutes/day is spent in air with excessive dust.

- **Table 9-24** provides data for the frequency of starting a motor vehicle in a garage or carport and started with the garage door closed.

- **Table 9-25** provides data for the range of minutes/day spent playing on sand, gravel, dirt, or grass and playing when fill dirt was present.

- **Table 9-26** provides the percentile data for the same activity shown in Table 9-25.

- **Table 9-27** presents data for time (minutes/day) spent playing on the grass by number of respondents. The majority of respondents spent more than 120 minutes/day in this activity.

- **Table 9-28** presents percentile data for the same activity shown in Table 9-27. The 50th percentile rate is 60 minutes/day for all age groups.

- **Table 9-29** provides number of times/month swimming in a freshwater swimming pool by number of respondents. The majority of respondents swim in freshwater pools 1 or 2 times/month.

- **Table 9-30** provides percentile data for the same activity shown in Table 9-29. The 50th percentile values are 42.5 minutes/month for age group 1-4 years and 60 minutes/month for age gropus 5-11 and 12-17 years.

- **Table 9-31** presents the range of the average amount of time (minutes/month) actually spent in the water by swimmers. The majority of swimmers spent an average of 50-60 minutes/month in the water.

Tables 9-32 through 9-44 provide statistics for 24-hour cumulative time (minimum, mean, maximum) spent in selected activities. The minimum is the minimum number of minutes spent in

the activity. The mean is the mean 24-hour cumulative number of minutes spent by doers. The maximum is the maximum number of minutes spent in the activity. The percentiles are the percentage of doers below or equal to the given number of minutes.

- **Table 9-32** provides number of minutes spent playing indoors and playing outdoors.
- **Table 9-33** provides number of minutes spent sleeping/napping in a day.
- **Table 9-34** presents data for time spent attending full-time school.
- **Table 9-35** provides data for time spent in active sports and for time spent in sports/exercise.
- **Table 9-36** presents data for time spent in outdoor recreation and for walking.
- **Table 9-37** provides data for time spent bathing.
- **Table 9-38** presents statistics for minutes eating or drinking.
- **Table 9-39** provides data for time spent indoors at school and in a restaurant.
- **Table 9-40** provides information for time spent outdoors on school grounds/playgrounds and at a pool/river/lake.
- **Table 9-41** provides information on time spent at home in the kitchen, bathroom, and bedroom, and indoors in a residence (all rooms).
- **Table 9-42** presents data for time spent traveling inside a vehicle.
- **Table 9-43** provides data for time spent outdoors (outside the residence) and outdoor other than near a residence such as parks, golf courses, or farms.
- **Table 9-44** provides information for time spent in malls, grocery stores, and other stores.
- **Table 9-45** presents data for minutes spent with smokers present.
- **Table 9-46** provides data for time (minutes) spent smoking by number of respondents.
- **Table 9-47** provides percentile data for the same activity shown in Table 9-44.

Advantages of the NHAPS dataset are that it is representative of the U.S. population and it has been adjusted to be balanced geographically, seasonally, and for day/time. Also, it is

representative of all ages, gender, and is race specific. A disadvantage of the study is that for ages 1-17, the "N" is small for most activities. In addition, means cannot be calculated for time spent over 60, 120, and 181 minutes in selected activities. Therefore, actual time spent at the high end of the distribution for these activities cannot be captured.

Funk et al. (1998) - Quantifying the Distribution of Inhalation Exposure in Human Populations - Funk et al. (1997) used the data from the California Air Resources Board (CARB) study to determine distributions of exposure time by tracking the time spent participating in daily at home and at school activities for male and female children and adolescents. CARB performed two studies from 1987 to 1990; the first was focused on adults and adolescents (12-17 years old), while the second focused on children (6-11 years old) (Funk et al., 1998). The targeted groups were noninstitutionalized English speaking Californians with a telephone in their residence. Individuals were contacted by telephone and asked to account for every minute within the previous 24 hours, including the amount of time spent on an activity and the location of the activity. The surveys varied from day to day and season to season.

All the activities that were documented were separated into two groups, "at home" (any activity at principal residence), or "away." Each activity was assigned to one of three ventilation levels (Ve), low, moderate, or high. Resting activities were placed in the low Ve, and moderate exertion activities were assigned to moderate Ve. Activities requiring high levels of physical exertion were placed in the high Ve group. Ambiguous activities that were encountered were assigned to moderate ventilation levels. Among the adolescents and children studied, means were determined for the aggregate age groups, as shown in Table 9-48.

Several statistical methods, such as Chi-quare, Kolmogorov,-Smirnov, and Anderson-Darling, were used to determine whether the time spent in an activity group had a known distribution (Funk et al., 1998). All the activities that were identified in the CARB study were assigned to the three ventilation levels. Most of the activities performed by children were low to moderate Ve as shown in Table 9-49.

The aggregate time periods spent at home in each activity are shown in Table 9-50. Aggregate time spent at home performing different activities was compared between genders. There were no significant differences between adolescent male and females in any of the activity groups (Funk et al., 1998) (Table 9-51). In children ages 6-11 years there were differences found between gender and age at the low ventilation levels. In the moderate ventilation level there were

significant differences between two age groups (6-8 years, and 9-11 years) and gender (Funk et al., 1998) (Table 9-52).

Large proportions of the respondents in the study did not participate in high ventilation activities; discrete distributions were used to characterize high ventilation activity groups (Funk et al., 1998). Lognormal distribution best described the time spent by children at high ventilation levels.

Hubal et al. (2000) - Children's Exposure Assessment: A Review of Factors Influencing Children's Exposure, and the Data Available to Characterize and Assess that Exposure - Hubal et al. (2000) reviewed available data to characterize and assess environmental exposures to children. As part of that review, available activity patterns data were evaluated. Hubal reviewed the EPA National Exposure Research Laboratory's Consolidated Human Activity Database (CHAD), which contains data from several studies on human activities. For children and adolescents younger than 18 years, CHAD contains 4,300 person-days of information and 3,009 person-days of microactivity data for 2,640 children less than 12 years old (Hubal et al., 2000) (Table 9-53). Specific examples of the type of microactivity data available in CHAD for children are shown in Tables 9-54 and 9-55. The number of hours spent in various microenvironments are shown in Table 9-54 and time spent in various activities indoors at home in Table 9-55.

The authors noted that CHAD contains approximately "140 activity codes and 110 location codes, but the data generally are not available for all activity locations for any single respondent. In fact, not all of the codes were used for most of the studies. Even though many codes are used in macroactivity studies, many of the activity codes do not adequately capture the richness of what children actually do. They are much too broadly defined and ignore many child-oriented behaviors. Thus, there is a need for more and better-focused research into children's activities." CHAD is available on the EPA Intranet (Hubal et al., 2000).

9.3 RECOMMENDATIONS

Assessors are commonly interested in a number of specific types of time use data including time/frequencies for bathing, showering, gardening, residence time, indoor versus outdoor time, swimming, occupational tenure, and population mobility. Recommendations for each of these are discussed below. The confidence in the recommendations for activity patterns is presented in Table 9-56.

9.3.1 Recommendations for Activity Patterns

This chapter presents several studies that provide data on activity patterns. Table 9-57 summarizes information on the various studies. Recommendations for selected activities commonly used in exposure assessments and known to increase exposure to certain chemicals are provided to follow. These activities are time spent indoors versus outdoors, showering, swimming, residential time spent indoors and outdoors, time spent playing on sand and gravel, and time spent playing on grass.

Time Spent Indoors Versus Outdoors - Assessors often require knowledge of time individuals spend indoors versus outdoors. Ideally, this issue would be addressed on a site-specific basis since the times are likely to vary considerably depending on the climate, residential setting (i.e., rural versus urban), personal traits (i.e., age, health) and personal habits.

Activities can vary significantly with differences in age. Table 9-58 summarizes the studies that present information on time indoors and outdoors. Of these studies, Timmer et al. (1985) in addition to being a national study, presents the data for a more comprehensive set of age groupings for children. Timmer et al. (1985) presented data on time spent in various activities for boys and girls ages 3-17 years. This national study focused on activities performed indoors such as household work, personal care, eating, sleeping, school, studying, attending church, watching television, and engaging in household conversations. The average times spent in each activity, and half the times spent in each activity which could have occurred indoors or outdoors, were summed. The results are presented in Table 9-59 For various age groups. Although there is good agreement between the Robinson Thomas 1991 and Timmer 1985 studies, the recommendations are based on the Timmer study because it provides data for younger children. The recommendations are based on the Timmer data shown in Table 9-58.

Showering - The recommended shower frequency of one shower per day is based on the NHAPS data summarized in Table 9-17. This table showed that 341 of the 451 total participants indicated taking at least one shower the previous day.

Recommendations for showering duration are based on the study of Tsang and Klepeis (1996). A recommended value for average showering time is 10 minutes (Table 9-18) based on professional judgement.

Swimming - Data for swimming frequency is taken from the NHAPS Study (Tsang and Klepeis, 1996). Of the 653 participants, who answered yes to the question “in the past month, did

you swim in a freshwater pool?", 241 were ages 1-17 years. The results to this question are summarized in Table 9-29. The recorded number of times respondents swam in the past month ranged from 1 to 60 with the greatest number of respondents reporting they swam one time per month. Thus, the recommended swimming frequency is one event/ month. The recommended swimming duration, 60 minutes per swimming event, is based on the NHAPS distribution shown on Table 9-30. Sixty minutes is based on an average of the 50th percentile values. The 90th percentile value is 180 minutes per swimming event (based on one event/month); and the 99th percentile value is 181 minutes. This value (181) indicates that more than 180 minutes were spent.

Residential Time Spent Indoors and Outdoors - The recommendations for time spent indoors at one's residence for children 1-17 years old is 18 hours/day. This is based on the NHAPS data summarized in Table 9-41 for number of minutes spent indoors in a residence (all rooms). The average of the 50th percentile values for all age groups is 1,061 minutes per day (17.7 hours/day); and a 90th percentile value of 1,361 minutes per day (22.6 hours/day).

The recommended value for time spent outdoors outside one's residence is 2 hours per day based on NHAPS data shown on Table 9-43 for time spent outdoors (outside the residence). The 50th percentile values range from 100-150 minutes/day and the 90th percentile values range from 300-400 minutes/day as shown in Table 9-43.

Playing on Sand or Gravel, and on Grass - The recommended value for time spent playing on sand or gravel is 60 minutes/day. This value is based on NHAPS data shown in Table 9-25. This recommendation is based on professional judgement. The data in Table 9-25, show that the majority of respondents are captured in the 0-0 minutes/day category. However, for the other time categories, the majority of respondents are captured in the 50-60 minutes/day category.

The recommended value for time spent playing on grass is 60 minutes/day based on the 50th percentile data shown in Table 9-28 and the 50-60 minutes/day category data in Table 9-27.

9.3.2 Summary of Recommended Activity Factors

Table 9-59 includes a summation of the recommended activity pattern factors presented in this section and the studies which provided data on the specific activities. The type of activities include indoor activities, outdoor activities, taking a shower, swimming, time spent playing on sand or gravel, and time spent playing on grass.

9.4 REFERENCES FOR CHAPTER 9

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Table 9-1. Mean Time Spent (minutes) Performing Major Activities Grouped by Age, Sex and Type of Day

Activity	Age (3-11 years)				Age (12-17 years)			
	Duration of Time (mins/day)				Duration of Time (mins/day)			
	Weekdays		Weekends		Weekdays		Weekends	
	Boys (n=118)	Girls (n=111)	Boys (n=118)	Girls (n=111)	Boys (n=77)	Girls (n=83)	Boys (n=77)	Girls (n=83)
Market Work	16	0	7	4	23	21	58	25
Household Work	17	21	32	43	16	40	46	89
Personal Care	43	44	42	50	48	71	35	76
Eating	81	78	78	84	73	65	58	75
Sleeping	584	590	625	619	504	478	550	612
School	252	259	--	--	314	342	--	--
Studying	14	19	4	9	29	37	25	25
Church	7	4	53	61	3	7	40	36
Visiting	16	9	23	37	17	25	46	53
Sports	25	12	33	23	52	37	65	26
Outdoors	10	7	30	23	10	10	36	19
Hobbies	3	1	3	4	7	4	4	7
Art Activities	4	4	4	4	12	6	11	9
Playing	137	115	177	166	37	13	35	24
TV	117	128	181	122	143	108	187	140
Reading	9	7	12	10	10	13	12	19
Household Conversations	10	11	14	9	21	30	24	30
Other Passive Leisure	9	14	16	17	21	14	43	33
NA[a]	22	25	20	29	14	17	10	4
Percent of Time Accounted for by Activities Above	94%	92%	93%	89%	93%	92%	88%	89%

a NA = Unknown
Source: Timmer et al., 1985.

Table 9-2. Mean Time Spent (minutes) in Major Activities Grouped by Type of Day for Five Different Age Groups

	Time Duration (mins)										Significant Effects[a]
	Weekday					Weekend					
Age (years)	3-5	6-8	9-11	12-14	15-17	3-5	6-8	9-11	12-14	15-17	
Activities											
Market Work	--	14	8	14	28	--	4	10	29	48	
Personal Care	41	49	40	56	60	47	45	44	60	51	A,S,AxS (F>M)
Household Work	14	15	18	27	34	17	27	51	72	60	A,S, AxS (F>M)
Eating	82	81	73	69	67	81	80	78	68	65	A
Sleeping	630	595	548	473	499	634	641	596	604	562	A
School	137	292	315	344	314	--	--	--	--	--	
Studying	2	8	29	33	33	1	2	12	15	30	A
Church	4	9	9	9	3	55	56	53	32	37	A
Visiting	14	15	10	21	20	10	8	13	22	56	A (Weekend only)
Sports	5	24	21	40	46	3	30	42	51	37	A,S (M>F)
Outdoor activities	4	9	8	7	11	8	23	39	25	26	
Hobbies	0	2	2	4	6	1	5	3	8	3	
Art Activities	5	4	3	3	12	4	4	4	7	10	
Other Passive Leisure	9	1	2	6	4	6	10	7	10	18	A
Playing	218	111	65	31	14	267	180	92	35	21	A,S (M>F)
TV	111	99	146	142	108	122	136	185	169	157	A,S, AxS (M>F)
Reading	5	5	9	10	12	4	9	10	10	18	A
Being read to	2	2	0	0	0	3	2	0	0	0	A
NA	30	14	23	25	7	52	7	14	4	9	A

a Effects are significant for weekdays and weekends, unless otherwise specified A = age effect, $P<0.05$, for both weekdays and weekend activities; S = sex effect $P<0.05$, F>M, M>F = females spend more time than males, or vice versa; and AxS = age by sex interaction, $P<0.05$.

Source: Timmer et al., 1985.

Table 9-3. Mean Time Spent Indoors and Outdoors Grouped by Age and Day of the Week

Age Group (yrs)	Time Indoors Weekday (hrs/day)	Time Indoors Weekend (hrs/day)	Time Outdoors Weekday (hrs/day)	Time Outdoors Weekend (hrs/day)
3-5	1.94	18.9	2.5	3.1
6-8	20.7	18.6	1.8	2.5
9-11	20.8	18.6	1.3	2.3
12-14	20.7	18.5	1.6	1.9
15-17	19.9	17.9	1.4	2.3

Source: Adapted from Timmer et al. (1985).

Table 9-4. Mean Time Spent at Three Locations for both CARB and National Studies (ages 12 years and older)

Location Category	Mean duration (mins/day)			
	CARB (n = 1762)[b]	S.E.[a]	National (n = 2762)[b]	S.E.
Indoor	1255[c]	28	1279[c]	21
Outdoor	86[d]	5	74[d]	4
In-Vehicle	98[d]	4	87[d]	2
Total Time Spent	1440		1440	

[a] S.E. = Standard Error of Mean

[b] Weighted Number - National sample population was weighted to obtain a ratio of 46.5 males and 53.5 females, in equal proportion for each day of the week, and for each quarter of the year.

[c] Difference between the mean values for the CARB and national studies is not statistically significant.

[d] Difference between the mean values for the CARB and national studies is statistically significant at the 0.05 level.

Source: Robinson and Thomas, 1991.

Table 9-5. Mean Time Spent (minutes/day) in Various Microenvironments Grouped by Total Population and Gender (12 years and over) in the National and CARB Data

	National Data Mean Duration (mins/day) (standard error)[a]					
Microenvironment	N = 1284[b] Male	"Doer"[c] Male	N = 1478[b] Female	"Doer" Female	N = 2762[b] Total	"Doer" Total
Autoplaces	5 (1)	90	1 (0)	35	3 (0)	66
Restaurant/bar	22 (2)	73	20 (2)	79	21 (1)	77
In-vehicle	92 (3)	99	82 (3)	94	87 (2)	97
In-Vehicle/other	1 (1)	166	1 (0)	69	1 (0)	91
Physical/outdoors	24 (3)	139	11 (2)	101	17 (2)	135
Physical/indoors	11 (1)	84	6 (1)	57	8 (1)	74
Work/study-residence	17 (2)	153	15 (2)	150	16 (1)	142
Work/study-other	221 (10)	429	142 (7)	384	179 (6)	390
Cooking	14 (1)	35	52 (2)	67	34 (1)	57
Other activities/kitchen	54 (3)	69	90 (4)	102	73 (2)	88
Chores/child	88 (3)	89	153 (5)	154	123 93)	124
Shop/errand	23 (2)	56	38 (2)	74	31 (1)	67
Other/outdoors	70 (6)	131	43 (4)	97	56 (4)	120
Social/cultural	71 (4)	118	75 (4)	110	73 (3)	118
Leisure-eat/indoors	235 (8)	241	215 (7)	224	224 (5)	232
Sleep/indoors	491 (14)	492	496 (11)	497	494 (9)	495

	CARB Data Mean Duration (mins/day) (standard error)[a]					
Microenvironment	N = 867[b] Male	"Doer"[c] Male	N = 895[b] Female	"Doer" Female	N = 1762[b] Total	"Doer" Total
Autoplaces	31 (8)	142	9 (2)	50	20 (4)	108
Restaurant/bar	45 (4)	106	28 (3)	86	36 (3)	102
In-vehicle	105 (7)	119	85 (4)	100	95 (4)	111
In-Vehicle/other	4 (1)	79	3 (2)	106	3 (1)	94
Physical/outdoors	25 (3)	131	8 (1)	86	17 (2)	107
Physical/indoors	8 (1)	63	5 (1)	70	7 (1)	68
Work/study-residence	14 (3)	126	11 (2)	120	13 (2)	131
Work/study-other	213 (14)	398	156 (11)	383	184 (9)	450
Cooking	12 (1)	43	42 (2)	65	27 (1)	55
Other activities/kitchen	38 (3)	65	60 (4)	82	49 (2)	74
Chores/child	66 (4)	75	134 (6)	140	100 (4)	109
Shop/errand	21 (3)	61	41 (3)	78	31 (2)	70
Other/outdoors	95 (9)	153	44 (4)	82	69 (5)	117
Social/cultural	47 (4)	112	59 (5)	114	53 (3)	112
Leisure-eat/indoors	223 (10)	240	251 (10)	263	237 (7)	250
Sleep/indoors	492 (17)	499	504 (15)	506	498 (12)	501

a Standard error of the mean
b Weighted number
c Doer = Respondents who reported participating in each activity/location spent in microenvironments.
Source: Robinson and Thomas, 1991.

Table 9-6. Mean Time Spent (minutes/day) in Various Microenvironments by Type of Day for the California and National Surveys (sample population ages 12 years and older)

Weekday Microenvironment	Mean Duration (standard error)[a] (mins/day)		Mean Duration for "Doer"[b] (mins/day)	
	CARB (n=1259)[c]	NAT (n=1973)[c]	CARB	NAT
1 Autoplaces	21 (5)	3 (1)	108	73
2 Restaurant/Bar	29 (3)	20 (2)	83	73
3 In-Vehicle/Internal Combustion	90 (5)	85 (2)	104	95
4 In-Vehicle/Other	3 (1)	1 (0)	71	116
5 Physical/Outdoors	14 (2)	15 (2)	106	118
6 Physical/Indoors	7 (1)	8 (1)	64	68
7 Work/Study-Residence	14 (2)	16 (2)	116	147
8 Work/Study-Other	228 (11)	225 (8)	401	415
9 Cooking	27 (2)	35 (2)	58	57
10 Other Activities/Kitchen	51 (3)	73 (3)	76	87
11 Chores/Child	99 (5)	124 (4)	108	125
12 Shop/Errand	30 (2)	30 (2)	67	63
13 Other/Outdoors	67 (6)	51 (4)	117	107
14 Social/Cultural	42 (3)	62 (3)	99	101
15 Leisure-Eat/Indoors	230 (9)	211 (6)	244	218
16 Sleep/Indoors	490 (14)	481 (10)	495	483

Weekend Microenvironment	Mean Duration (standard error)[a] (mins/day)		Mean Duration for "Doer"[b] (mins/day)	
	CARB (n=503)[c]	NAT (n=789)[c]	CARB	NAT
1 Autoplaces	19 (4)	3 (1)	82	62
2 Restaurant/Bar	55 (6)	23 (2)	127	84
3 In-Vehicle/Internal Combustion	108 (8)	91 (6)	125	100
4 In-Vehicle/Other	5 (3)	0 (0)	130	30
5 Physical/Outdoors	23 (3)	23 (4)	134	132
6 Physical/Indoors	7 (1)	9 (2)	72	80
7 Work/Study-Residence	10 (2)	15 (3)	155	165
8 Work/Study-Other	74 (11)	64 (6)	328	361
9 Cooking	27 (2)	34 (2)	60	55
10 Other Activities/Kitchen	44 (3)	73 (4)	71	90
11 Chores/Child	103 (7)	120 (5)	114	121
12 Shop/Errand	35 (4)	35 (3)	81	75
13 Other/Outdoors	74 (7)	67 (7)	126	132
14 Social/Cultural	79 (7)	99 (6)	140	141
15 Leisure-Eat/Indoors	256 (12)	257 (11)	273	268
16 Sleep/Indoors	520 (20)	525 (17)	521	525

[a] Standard Error of Mean
[b] Doer = Respondent who reported participating in each activity/location spent in microenvironments.
[c] Weighted Number
Source: Robinson and Thomas, 1991.

Table 9-7. Mean Time Spent (minutes/day) in Various Microenvironments by Age Groups for the National and California Surveys

Microenvironment	National Data Mean Duration (Standard Error)[a]			
	Age 12-17 years N=340[b]	"Doer"[c]	Age 18-24 years N=340	"Doer"
Autoplaces	2 (1)	73	7 (2)	137
Restaurant/bar	9 (2)	60	28 (3)	70
In-vehicle/internal combustion	79 (7)	88	103 (8)	109
In-vehicle/other	0 (0)	12	1 (1)	160
Physical/outdoors	32 (8)	130	17 (4)	110
Physical/indoors	15 (3)	87	8 (2)	76
Work/study-residence	22 (4)	82	19 (6)	185
Work/study-other	159 (14)	354	207 (20)	391
Cooking	11 (3)	40	18 (2)	39
Other activities/kitchen	53 (4)	64	42 (3)	55
Chores/child	91 (7)	92	124 (9)	125
Shop/errands	26 (4)	68	31 (4)	65
Other/outdoors	70 (13)	129	34 (4)	84
Social/cultural	87 (10)	120	100 (12)	141
Leisure-eat/indoors	237 (16)	242	181 (11)	189
Sleep/indoors	548 (31)	551	511 (26)	512

Microenvironment	CARB Data Mean Duration (Standard Error)[a]			
	Age 12-17 years N=183[b]	"Doer"[c]	Age 18-24 years N=250	"Doer"
Autoplaces	16 (8)	124	16 (4)	71
Restaurant/bar	16 (4)	44	40 (8)	98
In-vehicle/internal combustion	78 (11)	89	111 (13)	122
In-vehicle/other	1 (0)	19	3 (1)	60
Physical/outdoors	32 (7)	110	13 (3)	88
Physical/indoors	20 (4)	65	5 (2)	77
Work/study-residence	25 (5)	76	30 (11)	161
Work/study-other	196 (30)	339	201 (24)	344
Cooking	3 (1)	19	14 (2)	40
Other activities/kitchen	31 (4)	51	31 (5)	55
Chores/child	72 (11)	77	79 (8)	85
Shop/errands	14 (3)	50	35 (7)	71
Other/outdoors	58 (8)	78	80 (15)	130
Social/cultural	63 (14)	109	65 (10)	110
Leisure-eat/indoors	260 (27)	270	211 (19)	234
Sleep/indoors	557 (44)	560	506 (30)	510

[a] Standard error.
[b] All N's are weighted number.
[c] Doer = Respondents who reported participating in each activity/location spent in microenvironments.
Source: Robinson and Thomas, 1991.

Table 9-8. Mean Time (minutes/day) Children Ages 12 Years and Under Spent in Ten Major Activity Categories for All Respondents

Activity Category	Mean Duration (mins/day)	% Doing	Mean Duration for Doers[b] (mins/day)	Median Duration for Doer (mins/day)	Maximum Duration for Doers (mins/day)	Detailed Activity with Highest Avg. Minutes (code)
Work-related[a]	10	25	39	30	405	Eating at work/school/daycare (06)
Household	53	86	61	40	602	Travel to household (199)
Childcare	< 1	< 1	83	30	290	Other child care (27)
Goods/Services	21	26	81	60	450	Errands (38)
Personal Needs and Care[c]	794	100	794	770	1440	Night sleep (45)
Education[d]	110	35	316	335	790	School classes (50)
Organizational Activities	4	4	111	105	435	Attend meetings (60)
Entertain/Social	15	17	87	60	490	Visiting with others (75)
Recreation	239	92	260	240	835	Games (87)
Communication/Passive Leisure	192	93	205	180	898	TV use (91)
Don't know/Not coded	2	4	41	15	600	--
All Activities[e]	1441					

[a] Includes eating at school or daycare, an activity not grouped under the "education activities" (codes 50-59, 549).
[b] "Doers" indicate the respondents who reported participating in each activity category.
[c] Personal care includes night sleepand daytime naps, eating, travel for personal care.
[d] Education includes student and other classes, homework, library, travel for education.
[e] Column total may not sum to 1440 due to rounding error
Source: Wiley et al., 1991.

Table 9-9. Mean Time Children Spent in Ten Major Activity Categories Grouped by Age and Gender

Activity Category	Mean Duration (minutes/day)									
	Boys					Girls				
	0-2 yrs	3-5 yrs	6-8 yrs	9-11 yrs	0-11 yrs	0-2 yrs	3-5 yrs	6-8 yrs	9-11 yrs	0-11 yrs
Work-related	4	9	14	12	10	5	12	11	10	10
Household	33	45	55	65	48	58	44	51	76	57
Childcare	0	0	0	1	<1	0	0	0	4	1
Goods/Services	20	22	19	14	19	22	25	23	22	23
Personal Needs and Care[a]	914	799	736	690	792	906	816	766	701	797
Education[b]	60	67	171	138	106	41	95	150	176	115
Organizational Activities	1	3	7	6	4	6	1	4	6	4
Entertainment/Social	3	15	5	34	13	5	16	9	36	17
Recreation	217	311	236	229	250	223	255	238	194	228
Communication/Passive Leisure	187	166	195	250	197	171	173	189	213	186
Don't know/Not coded	1	4	1	1	2	3	1	<1	3	2
All Activities[c]	1440	1441	1439	1440	1442	1440	1438	1441	1441	1440
Sample Sizes Unweighted N's	172	151	145	156	624	141	151	124	160	576

[a] Personal needs and care includes night sleep and daytime naps, eating, travel for personal care.
[b] Education includes student and other classes, homework, library, travel for education.
[C] The column totals may differ from 1440 due to rounding error.
Source: Wiley et al., 1991.

Table 9-10. Mean Time Children Ages 12 Years and Under Spent in Ten Major Activity Categories Grouped by Seasons and Regions

Activity Category	Mean Duration (minutes/day)								
	Season					Region of California			
	Winter (Jan-Mar)	Spring (Apr-June)	Summer (July-Sept)	Fall (Oct-Dec)	All Seasons	So. Coast	Bay Area	Rest of State	All Regions
Work-related	10	10	6	13	10	10	10	8	10
Household	47	58	53	52	53	45	62	55	53
Childcare	<1	1	<1	<1	<1	<1	<1	1	<1
Goods/Services	19	17	26	23	21	20	21	23	21
Personal Needs and Care[a]	799	774	815	789	794	799	785	794	794
Education[b]	124	137	49	131	110	109	115	109	110
Organizational Activities	3	5	5	3	4	2	6	6	4
Entertainment/Social	14	12	12	22	15	17	10	16	15
Recreation	221	243	282	211	239	230	241	249	239
Communication/Passive Leisure	203	180	189	195	192	206	190	175	192
Don't know/Not coded	<1	2	3	<1	2	1	1	3	2
All Activities[c]	1442	1439	1441	1441	1441	1440	1442	1439	1441
Sample Sizes (Unweighted)	318	204	407	271	1200	224	263	713	1200

[a] Personal needs and care includes night sleep and daytime naps, eating, travel for personal care.
[B] Education includes student and other classes, homework, library, travel for education.
[c] The column totals may not be equal to 1440 due to rounding error.
Source: Wiley et al., 1991.

Table 9-11. Mean Time Children Ages 12 Years and Under Spent in Six Major Location Categories for All Respondents (minutes/day)

Location Category	Mean Duration (mins)	% Doing	Mean Duration for Doers (mins)	Median Duration for Doers (mins)	Maximum Duration for Doers (mins)	Detailed Location with Highest Avg. Time
Home	1,078	99	1,086	1,110	1,440	Home - bedroom
School/Childcare	109	33	330	325	1,260	School or daycare facility
Friend's/Other's House	80	32	251	144	1,440	Friend's/other's house - bedroom
Stores, Restaurants, Shopping Places	24	35	69	50	475	Shopping mall
In-transit	69	83	83	60	1,111	Traveling in car
Other Locations	79	57	139	105	1,440	Park, playground
Don't Know/Not Coded	<1	1	37	30	90	--
All Locations	1,440					

Source: Wiley et al., 1991.

Table 9-12. Mean Time Children Spent in Six Location Categories Grouped by Age and Gender

Location Category	Mean Duration (minutes/day)									
	Boys					Girls				
	0-2 yrs	3-5 yrs	6-8 yrs	9-11 yrs	All Boys	0-2 yrs	3-5 yrs	6-8 yrs	9-11 yrs	All Girls
Home	1,157	1,134	1,044	1,020	1,094	1,151	1,099	1,021	968	1,061
School/Childcare	86	88	144	120	108	59	102	133	149	111
Friend's/Other's House	67	73	77	109	80	56	47	125	102	80
Stores, Restaurants, Shopping Places	21	25	22	15	21	23	35	27	26	28
In-transit	54	62	61	62	59	76	88	53	93	79
Other Locations	54	58	92	114	77	73	68	81	102	81
Don't Know/Not Coded	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
All Locations[a]	1,439	1,440	1,439	1,440	1,439	1,438	1,440	1,440	1,440	1,440
Sample Sizes (Unweighted)	172	151	145	156	624	141	151	124	160	576

[a] The column totals may not sum to 1,440 due to rounding error.
Source: Wiley et al., 1991.

Table 9-13. Mean Time Children Spent in Six Location Categories Grouped by Season and Region

Location Category	Mean Duration (minutes/day)								
	Season					Region of California			
	Winter (Jan-Mar)	Spring (Apr-June)	Summer (July-Sept)	Fall (Oct-Dec)	All Seasons	So. Coast	Bay Area	Rest of State	All Regions
Home	1,091	1,042	1,097	1,081	1,078	1,078	1,078	1,078	1,078
School/Childcare	119	141	52	124	109	113	103	108	109
Friend's/Other's House	69	75	108	69	80	73	86	86	80
Stores, Restaurants, Shopping Places	22	21	30	24	24	26	23	23	24
In-transit	75	75	60	65	69	71	73	63	69
Other Locations	63	85	93	76	79	79	76	81	79
Don't Know/Not Coded	<1	<1	<1	<1	<1	<1	<1	<1	<1
All Locations[a]	1,439	1,439	1,440	1,439	1,439	1,439	1,440	1,440	1,439
Sample Sizes (Unweighted N's)	318	204	407	271	1,200	224	263	713	1,200

[a] The column totals may not sum to 1,440 due to rounding error.
Source: Wiley et al., 1991.

Table 9-14. Mean Time Children Spent in Proximity to Three Potential Exposures Grouped by All Respondents, Age, and Gender

Potential Exposures	Mean Duration (minutes/day)										
		Boys					Girls				
	All Children	0-2 yrs	3-5 yrs	6-8 yrs	9-11 yrs	All Boys	0-2 yrs	3-5 yrs	6-8 yrs	9-11 yrs	All Girls
Tobacco Smoke	77	115	75	66	66	82	77	68	71	74	73
Gasoline Fumes	2	2	1	1	4	2	1	1	3	1	1
Gas Oven Fumes	11	10	15	12	11	12	12	10	10	7	10
Sample Sizes (Unweighted N's)	1,166[a]	168	148	144	150	610	140	147	122	147	556

[a] Respondents with missing data were excluded.
Source: Wiley et al., 1991.

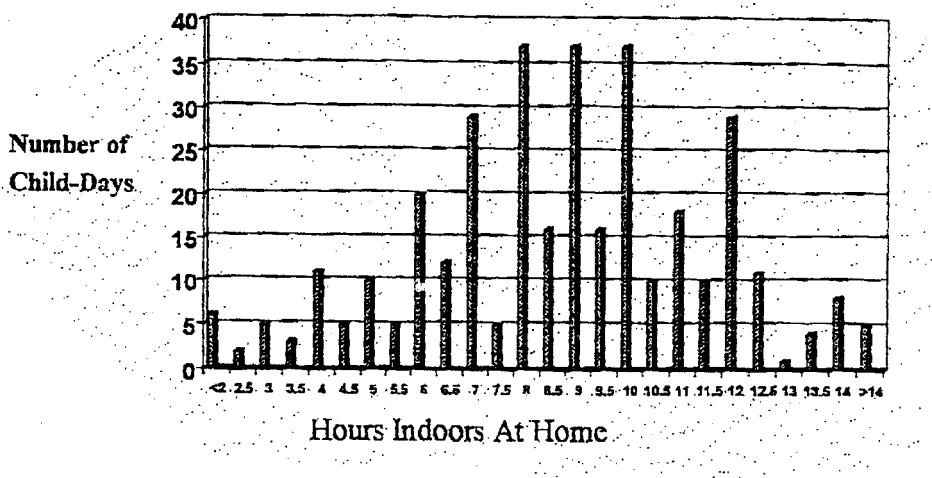

Figure 9-1. Distribution of the Number of Hours per Day Study Children Spent Indoors at Home

Source: Davis 1995.

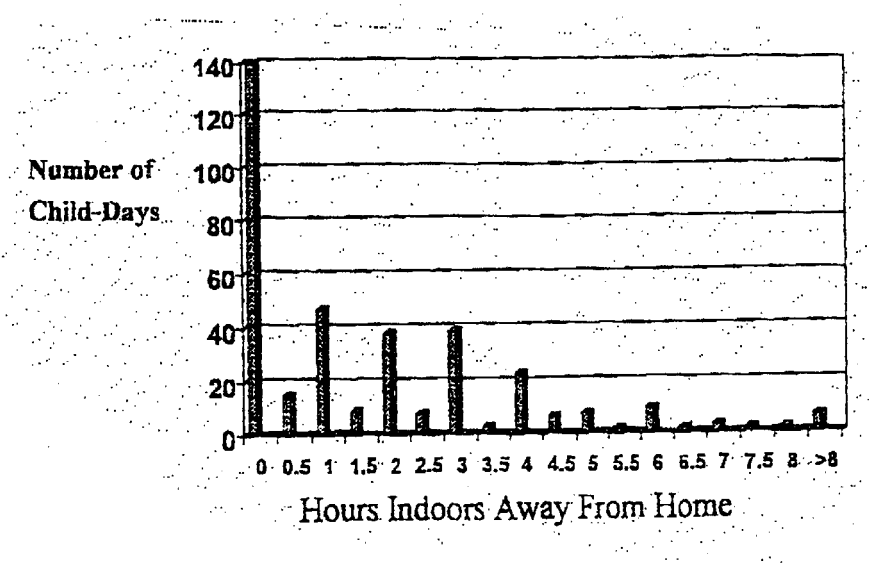

Figure 9-2. Distribution of the Number of Hours per Day Study Children Spent Indoors Away from Home

Source: Davis 1995.

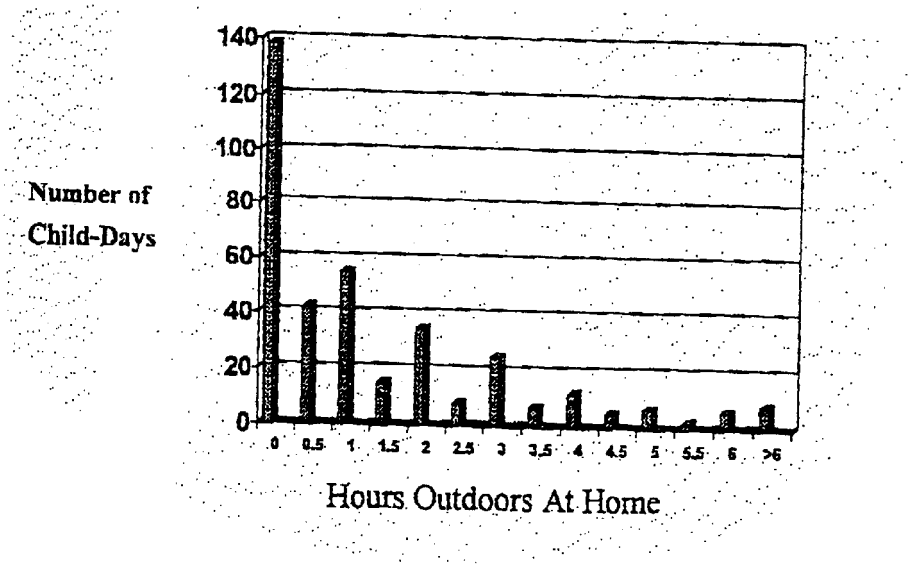

Figure 9-3. Distribution of the Number of Hours per Day Study Children Spent Outdoors at Home

Source: Davis 1995.

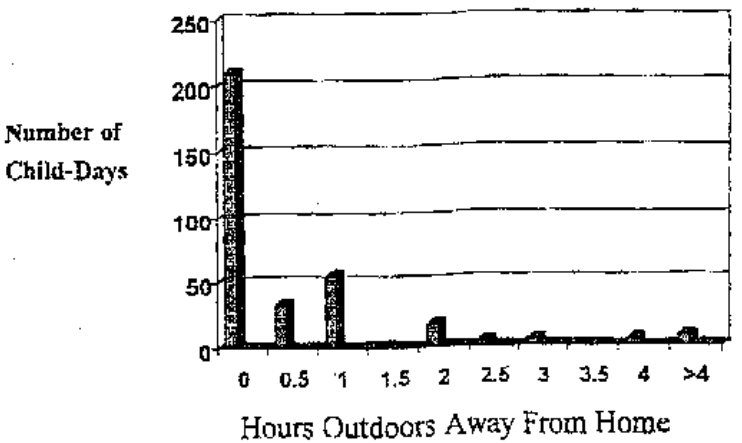

Figure 9-4. Distribution of the Number of Hours per Day Study Children Spent Outdoors Away at Home

Source: Davis 1995.

Table 9-15. Mean Time Spent Indoors and Outdoors Grouped by Age

Age Groups	Time Indoors (hours/day)	Time Outdoors (hours/day)
0-2	20	4
3-5	18.8	5.2
6-8	19.7	4.4
9-11	19.9	4.1

Table 9-16. Range of Recommended Defaults for Dermal Exposure Factors

	Water Contact				Soil Contact	
	Bathing		Swimming			
	Central	Upper	Central	Upper	Central	Upper
Event time and frequency[a]	10 min/event 1 event/day 350 days/yr	15 min/event 1 event/day 350 days/yr	0.5 hr/event 1 event/day 5 days/yr	1.0 hr/event 1 event/day 150 days/yr	40 events/yr	350 events/yr
Exposure duration	9 years	30 years	9 years	30 years	9 years	30 years

[a] Bathing event time is presented to be representative of baths as well as showers.

Source: U.S. EPA 1992.

Table 9-17. Number of Times Taking a Shower at Specified Daily Frequencies by the Number of Respondents

		TImes/Day									
	Total N	0	1	2	3	4	5	8	10	11:1-0+	DK
Age (years)											
1-4	41	*	30	9	1	*	*	*	*	*	1
5-11	140	*	112	26	1	*	*	*	*	*	1
12-17	270	*	199	65	6	*	*	*	*	*	*

Note: * Signifies missing data; Dk= don't know; N = sample size.

Source: Tsang and Klepeis,1996

Table 9-18. Time (minutes) Spent Taking a Shower and Spent in the Shower Room After Taking a Shower by the Number of Respondents

		Minutes/Shower							
	Total N	*-*	0-10	10-20	20-30	30-40	40-50	50-60	60-61
Times (minutes) Spent Taking Showers by the Number of Respondents									
Age									
1-4	41	1	13	14	10	1	*	2	*
5-11	140	1	60	52	18	3	2	4	*
12-17	270	2	94	104	40	13	9	7	1
Time (minutes) Spent in the Shower Room Immediately After Showering by the Number of Respondents									
Age (years)									
1-4	41	*	5	31	3	1	*	1	*
5-11	140	3	9	110	14	3	*	*	1
12-17	270	1	17	206	29	10	3	2	1

NOTE: * - Missing data; DK = don't know; N = sample size; Refused = Refused to answer. A value of 61 for number of minutes signifies that more than 60 minutes were spent.

Source: Tsang and Klepeis, 1996.

Table 9-19. Time (minutes) Spent Taking a Shower and Spent in the Shower Immediately After Showering

Table 9-19. Time (minutes) Spent Taking a Shower and Spent in the Shower Immediately After Showering

Category	Population Group	Total N	Percentiles											
			1	2	5	10	25	50	75	91	95	98	99	100
Number of Minutes Spent Taking a Shower (minutes/shower)														
Age (years)	1-4	40	5	5	5	5	5	10	17.5	30	50	60	60	60
Age (years)	5-11	139	3	4	5	5	10	15	20	30	40	60	60	60
Age (years)	12-17	268	5	5	5	7	10	15	25	35	45	60	60	61
Number of Minutes Spent in the Shower Room Immediately After Showering (minutes/shower)														
Age (years)	1-4	41	0	0	0	0	1	5	10	15	20	45	45	45
Age (years)	5-11	137	0	0	0	1	2	5	10	15	20	30	30	60
Age (years)	12-17	2619	0	0	0	1	3	5	10	20	30	40	52	61

NOTE: N = doer sample size. Percentiles are the percentage of doers below or equal to a given number of minutes. A value of 61 for number of minutes signifies that more than 60 minutes were spent.
Source: Tsang and Klepeis,1996

Table 9-20. Total Time Spent Altogether in the Shower or Bathtub and Time Spent in the Bathroom Immediately After by Number of Respondents

		Minutes/Bath												
	Total N	*-*	0-0	0-10	10-20	20-30	30-40	40-50	50-60	70-80	80-90	90-100	100-110	110-120	121-121
Total Time Spent Altogether in the Shower or Bathtub by the Number of Respondents															
Age (years)															
1-4	198	*	*	35	84	50	2	13	7	1	1	1	*	4	*
5-11	265	2	*	64	107	66	3	7	7	2	2	1	1	2	1
12-17	239	*	*	78	96	46	5	5	8	*	*	*	*	1	*
Time Spent in the Bathroom Immediately Following a Shower or Bath by the Number of Respondents															
Age (years)															
1-4	198	2	59	123	12	*	1	1	*	*	*	*	*	*	*
5-11	265	5	33	198	23	3	1	*	1	*	*	*	*	1	*
12-17	239	1	17	165	34	16	1	3	2	*	*	*	*	*	*

Note: * Signifies missing data. DK = respondents answered "don't know". Refused = respondents refused to answer. N = doer sample size in specified range of number of minutes spent. A value of "121" for number of minutes signifies that more than 120 minutes were spent.
Source: Tsang and Klepeis,1996

Table 9-21. Total Number of Minutes Spent Altogether in the Shower or Bathtub and Spent in the Bathroom Immediately Following a Shower or Bath

Category	Population Group	N	Percentiles											
			1	2	5	10	25	50	75	90	95	98	99	100
Total Number of Minutes Spent Altogether in the Shower or Bathtub (minutes/bath)														
Age (years)	1-4	198	1	5	5	10	15	20	30	45	60	120	120	120
Age (years)	5-11	263	4	5	5	10	13	20	30	30	60	90	120	121
Age (years)	12-17	239	4	4	5	7	10	15	30	30	45	60	60	120
Number of Minutes Spent in the Bathroom Immediately Following a Shower or Bath (minutes/bath)														
Age (years)	1-4	196	0	0	0	0	0	2	5	10	15	20	35	45
Age (years)	5-11	260	0	0	0	0	2	5	10	15	15	30	35	120
Age (years)	12-17	238	0	0	0	2	5	5	10	20	30	45	45	60

Note: A value of "121" for number of minutes signifies that more than 120 minutes were spent. N = doer sample size. Percentiles are the percentage of doers below or equal to a given number of minutes.
Source: Tsang and Klepeis, 1996.

Table 9-22. Range of Number of Times Washing the Hands at Specified Daily Frequencies by the Number of Respondents

		Number of Times/Day							
	Total N	*-*	0-0	1-2	3-5	6-9	10-19	20-29	30+	DK
Age (years)										
1-4	263	*	15	62	125	35	11	2	3	10
5-11	348	1	5	61	191	48	21	4	2	15
12-17	326	3	6	46	159	64	30	7	2	9

Note: * Signifies missing data. N = doer sample size in a specified range or number of minutes spent. DK= respondents answered "don't know". Refused = respondents refused to answer.
Source: Tsang and Klepeis,1996

Table 9-23. Number of Minutes Spent Working or Being Near Excessive Dust in the Air (minutes/day)

Category	Population Group	N	Percentiles											
			1	2	5	10	25	50	75	90	95	98	99	100
Age (years)	1-4	22	0	0	0	2	5	75	121	121	121	121	121	121
Age (years)	5-11	50	0	0.5	2	4	15	75	121	121	121	121	121	121
Age (years)	12-17	52	0	1	2	5	5	20	120	121	121	121	121	121

Note: A valueof "121" for number of minutes signifies that more than 120 minutes were spent. N = doer sample size. Percentiles are the percentage of doers below or equal to a given number of minutes.
Source: Tsang and Klepeis, 1996.

Table 9-24. Range of Number of Times per Day a Motor Vehicle was Started in a Garage or Carport and Started with the Garage Door Closed

		Times/day				
	Total N	1-2	3-5	6-9	10+	Dk
Range of the Number of Times an Automobile or Motor Vehicle was Started in a Garage or Carport at Specified Daily Frequencies by the Number of Respondents						
Age(years)						
1-4	111	68	39	2	2	*
5-11	150	93	49	6	*	2
12-17	145	86	42	12	1	4
Range of the Number of Times Motor Vehicle Was Started with Garage Door Closed at Specified Daily Frequencies by the Number of Respondents						
Age (years)						
1-4	111	99	8	2	*	2
5-11	150	141	6	*	*	3
12-17	145	127	9	4	1	4

Note: "*" Signifies missing data; "DK" = respondent answered don't know; Refused - the respondent refused to answer; N = doer sample size.
Source: Tsang and Klepeis, 1996

Table 9-25. Number of Minutes Spent Playing on Sand, Gravel, Dirt, or Grass

		Minutes/Day												
	Total N	*-*	0-0	0-10	10-20	20-30	30-40	40-50	50-60	70-80	80-90	90-100	110-120	121
Number of Minutes Spent Playing on Sand or Gravel in a Day by the Number of Respondents														
Age (years)														
1-4	216	13	115	15	9	15	2	3	15	1	5	*	7	16
5-11	200	7	96	11	12	14	*	5	25	1	2	1	6	20
12-17	41	1	23	1	2	4	*	*	3	*	*	1	3	3
Number of Minutes Spent Playing in Outdoors on Sand, Gravel, Dirt, or Grass When Fill Dirt Was Present by the Number of Respondents														
Age (years)														
*	3	*	*	1	*	*	*	*	1	*	*		*	1
1-4	216	11	118	14	10	13	1	4	18	4	*		7	16
5-11	200	15	103	14	8	15	*	1	17	1	*		9	17
12-17	41	3	19	3	2	7	*	*	4	1	*		2	*
18-64	237	23	138	19	9	13	*	1	20	1	1		3	9
> 64	3	1	2	*	*	*	*	*	*	*	*		*	*

Note: "*" = Signifies missing data. "DK" = Don't know. Refused = refused to answer. N = Doer sample size in specified range of number of minutes spent. A value of "121" for number of minutes signifies that more than 120 minutes were spent.
Source: Tsang and Klepeis, 1996.

Table 9-26. Number of Minutes Spent Playing in Sand, Gravel, Dirt or Grass (minutes/day)

			Percentiles											
Category	Population Group	N	1	2	5	10	25	50	75	90	95	98	99	100
Number of Minutes Spent Playing on Sand or Gravel (minutes/day)														
Age (years)	1-4	203	0	0	0	0	0	0	30	120	121	121	121	121
Age (years)	5-11	193	0	0	0	0	0	3	60	121	121	121	121	121
Age (years)	12-17	40	0	0	0	0	0	0	45	120	121	121	121	121
Number of Minutes Spent Playing on Sand, Gravel, Dirt, or Grass When Fill Dirt Was Present (minutes/day)														
Age (years)	1-4	205	0	0	0	0	0	0	30	120	121	121	121	121
Age (years)	5-11	185	0	0	0	0	0	0	30	120	121	121	121	121
Age (years)	12-17	38	0	0	0	0	0	0.5	30	60	120	120	120	120

NOTE: A value of "121" for number of minutes signifies that more than 120 minutes were spent. N = doer sample size. Percentiles are the percentage of doers below or equal to a given number of minutes.
Source: Tsang and Klepeis,1996

Table 9-27. Range of Number of Minutes Spent Playing on Grass in a Day by the Number of Respondents

		Minutes/Day														
	Total N	*-*	0-0	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	121-121
Age (years)																
1-4	216	10	24	19	21	25	1	4	35	*	1	8	*	1	18	49
5-11	200	15	24	10	10	19	2	3	38	1	*	8	1	*	20	49
12-17	41	2	5	1	2	8	*	1	8	*	*	1	*	*	8	5

NOTE: "*" signifies missing data. A value of "121" for number of minutes signifies that more than 120 minutes were spent. N = doer sample size. Percentiles are the percentage of doers below or equal to a given number of minutes. Refused = respondent refused to answer.
Source: Tsang and Klepeis,1996.

Table 9-28. Number of Minutes Spent Playing on Grass (minutes/day)

			Percentiles											
Category	Population Group	N	1	2	5	10	25	50	75	90	95	98	99	100
Age (years)	1-4	206	0	0	0	0	15	60	120	121	121	121	121	121
Age (years)	5-11	185	0	0	0	0	30	60	121	121	121	121	121	121
Age (years)	12-17	39	0	0	0	0	30	60	120	121	121	121	121	121

NOTE: A value of "121" for number of minutes signifies that more than 120 minutes were spent. N = doer sample size. Percentiles are the percentage of doers below or equal to a given number of minutes.
Source: Tsang and Klepeis,1996

Table 9-29. Number of Times Swimming in a Month in Freshwater Swimming Pool by the Number of Respondents

		Times/Month															
	Total N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Age (years)																	
1-4	63	11	14	7	3	3	4	1	3	1	4	*	2	1	1	2	*
5-11	100	16	15	7	9	6	4	2	4	*	7	*	5	*	*	11	2
12-17	84	21	13	7	4	8	4	2	3	1	8	*	1	*	*	2	*

	Times/Month															
	18	20	23	24	25	26	28	29	30	31	32	40	42	45	50	60	DK
Age (years)																	
1-4	*	2	*	*	*	*	*	1	2	*	1	*	*	*	*	*	*
5-11	*	3	*	1	2	*	*	*	5	*	*	*	*	*	1	*	*
12-17	1	4	*	*	*	1	*	*	2	*	*	*	*	*	*	1	1

Note: * Signifies missing data; "DK" = respondent answered don't know; N= sample size; Refused = respondent refused to answer.
Source: Tsang And Klepeis, 1996

Table 9-30. Number of Minutes Spent Swimming in a Month in Freshwater Swimming Pool (minutes/month)

Category	Population Group		Percentiles											
		N	1	2	5	10	25	50	75	90	95	98	99	100
Age (years)	1-4	60	3	3	7.5	15	20	42.5	120	180	181	181	181	181
Age (years)	5-11	95	2	3	20	30	45	60	120	180	181	181	181	181
Age (years)	12-17	83	4	5	15	20	40	60	120	180	181	181	181	181

Note: A Value of 181 for number of minutes signifies that more than 180 minutes were spent. N = doer sample size. Percentiles are the percentage of doers below or equal to a given number of minutes.
Source: Tsang and Klepeis,1996.

Table 9-31. Range of the Average Amount of Time Actually Spent in the Water by Swimmers by the Number of Respondents

		Minutes/Month														
	Total N	*-*	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	110-120	150-150	180-180	181-181
Age (years)																
1-4	63	3	5	12	12	1	4	8	*	*	2	*	7	1	3	5
5-11	100	5	3	2	12	5	4	25	*	*	7	*	16	2	11	8
12-17	84	1	3	7	10	2	6	15	*	1	8	1	14	4	6	6

Note: * Signifies missing data. DK = respondents answered don't know. Ref = respondents refused to answer. N = doer sample size in specified range of number of minutes spent. Values of 120 , 150 , and 180 for number of minutes signify that 2 hours, 2.5 hours, and 3 hours, respectively, were spent.
Source: Tsang and Klepeis,1996.

Table 9-32. Statistics for 24-Hour Cumulative Number of Minutes Spent Playing Indoors and Outdoors

Category	Population Group	N	Mean	Stdev	Stderr	Min	Max	Percentiles 5	25	50	75	90	95	98	99
Statistics for 24-Hour Cumulative Number of Minutes Spent in Indoor Playing															
Age (years)	1-4	11	130	80.2	24.2	15	270	15	60	115	180	255	270	270	270
Age (years)	5-11	11	93.6	64.3	19.4	30	195	30	30	60	175	180	195	195	195
Age (years)	12-17	4	82.5	45	22.5	30	120	30	45	90	120	120	120	120	120
Statistics for 24-Hour Cumulative Number of Minutes Spent in Outdoor Playing															
Age (years)	1-4	4	83.25	89.66	44.83	15	210	15	20	54	146.5	210	210	210	210
Age (years)	5-11	9	148.333	144.265	48.088	5	360	5	55	60	280	360	360	360	360
Age (years)	12-17	1	15	*	*	15	15	15	15	15	15	15	15	15	15

Note: A "*" Signifies missing data. "DK" = The respondent replied "don't know". N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.
Source: Tsang and Klepeis, 1996.

Table 9-33. Statistics for 24-Hour Cumulative Number of Minutes Spent Sleeping/Napping

Category	Population Group	N	Mean	Stdev	Stderr	Min	Max	Percentiles 5	25	50	75	90	95	98	99
Age (years)	1-4	499	732.363	124.328	5.5657	270	1320	540	655	720	810	900	930	1005	1110
Age (years)	5-11	702	625.058	100.656	3.799	120	1110	480	570	630	680	725	780	840	875
Age (years)	12-17	588	563.719	110.83	4.5706	150	1015	395	484	550	630	705	750	810	900

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.
Source: Tsang and Klepeis, 1996.

Table 9-34. Statistics for 24-Hour Cumulative Number of Minutes Spent Attending Full Time School

Category	Population Group	N	Mean	Stdev	Stderr	Min	Max	Percentiles 5	25	50	75	90	95	98	99
Age (years)	1-4	56	365.036	199.152	26.6128	20	710	30	172.5	427.5	530	595	628	665	710
Age (years)	5-11	297	387.811	98.013	5.6873	60	645	170	360	390	435	485	555	600	630
Age (years)	12-17	271	392.28	84.986	5.1625	10	605	200	375	405	435	460	485	510	555

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.
Source: Tsang and Klepeis, 1996.

Table 9-35. Statistics for 24-Hour Cumulative Number of Minutes Spent in Active Sports and for Time Spent in Sports/Exercise

Category	Population Group	N	Mean	Stdev	Stderr	Min	Max	Percentiles 5	25	50	75	90	95	98	99
Statistics for 24-Hour Cumulative Number of Minutes Spent in Active Sports															
Age (years)	1-4	105	115.848	98.855	9.6472	10	630	30	45	90	159	250	330	345	390
Age (years)	5-11	247	148.87	126.627	8.0571	2	975	20	60	120	188	320	390	510	558
Age (years)	12-17	215	137.46	124.516	8.4919	5	1065	15	60	110	180	265	375	470	520
Statistics for 24-Hour Cumulative Number of Minutes Spent in Sports/Exercise (a)															
Age (years)	1-4	114	118.982	109.17	10.2247	10	670	25	45	90	159	250	330	390	630
Age (years)	5-11	262	153.496	130.58	8.0673	2	975	20	60	120	200	330	415	525	580
Age (years)	12-17	237	134.717	122.228	7.9396	5	1065	15	60	110	179	265	360	470	520

a Includes active sports, exercise, hobbies.

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.
Source: Tsang and Klepeis, 1996.

Table 9-36. Statistics for 24-Hour Cumulative Number of Minutes Spent in Outdoor Recreation and Spent Walking

Category	Population Group	N	Mean	Stdev	Stderr	Min	Max	Percentiles 5	25	50	75	90	95	98	99
Statistics for 24-Hour Cumulative Number of Minutes Spent in Outdoor Recreation															
Age (years)	1-4	13	166.54	177.06	49.109	15	630	15	30	130	180	370	630	630	630
Age (years)	5-11	21	206.14	156.17	34.078	30	585	60	90	165	245	360	574	585	585
Age (years)	12-17	27	155.07	128.28	24.687	5	465	5	60	135	225	420	420	465	465
Statistics for 24-Hour Cumulative Number of Minutes Spent Walking															
Age (years)	1-4	58	24.3276	26.3268	3.4569	1	160	2	10	15	35	60	60	70	160
Age (years)	5-11	155	18.2129	21.0263	1.6889	1	170	1	5	10	25	40	60	65	100
Age (years)	12-17	223	25.8341	32.3753	2.168	1	190	2	6	15	30	60	100	135	151

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.
Source: Tsang and Klepeis, 1996.

Table 9-37. Statistics for 24-Hour Cumulative Number of Minutes Spent in Bathing (a)

								Percentiles							
Group Name	Group Code	N	Mean	Stdev	Stderr	Min	Max	5	25	50	75	90	95	98	99
Age (years)	1-4	330	29.9727	19.4226	1.0692	1	170	10	15	30	31	54.5	60	85	90
Age (years)	5-11	438	25.7511	35.3164	1.6875	1	690	5	15	20	30	45	60	60	75
Age (years)	12-17	444	23.1216	18.7078	0.8878	1	210	5	10	18	30	45	60	65	90

a Includes baby and child care, personal care services, washing and personal hygiene (bathing, showering, etc.)

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.

Source: Tsang and Klepeis, 1996.

Table 9-38. Statistics for 24-Hour Cumulative Number of Minutes Eating or Drinking

								Percentiles							
Category	Population Group	N	Mean	Stdev	Stderr	Min	Max	5	25	50	75	90	95	98	99
Age (years)	1-4	492	93.4837	52.8671	2.3834	2	345	20	60	90	120	160	190	225	270
Age (years)	5-11	680	68.5412	38.9518	1.4937	5	255	15	40	65	90	120	142.5	165	195
Age (years)	12-17	538	55.8587	34.9903	1.5085	2	210	10	30	50	75	105	125	150	170

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.
Source: Tsang and Klepeis, 1996.

Table 9-39. Statistics for 24-Hour Cumulative Number of Minutes Spent Indoors at School and Indoors at a Restaurant

								Percentiles							
Category	Population Group	N	Mean	Stdev	Stderr	Min	Max	5	25	50	75	90	95	98	99
Statistics for 24-Hour Cumulative Number of Minutes Spent Indoors at School															
Age (years)	1-4	43	288.465	217.621	33.187	5	665	10	60	269	500	580	595	665	665
Age (years)	5-11	302	396.308	109.216	6.285	5	665	170	365	403	445	535	565	625	640
Age (years)	12-17	287	402.551	125.512	7.409	15	855	120	383	420	450	500	565	710	778
Statistics for 24-Hour Cumulative Number of Minutes Spent Indoors at a Restaurant															
Age (years)	1-4	61	62.705	47.701	6.1075	4	330	10	35	55	85	115	120	130	330
Age (years)	5-11	84	56.69	38.144	4.1618	5	180	10	30	45	85	120	120	140	180
Age (years)	12-17	122	69.836	78.361	7.0945	2	455	10	30	45	65	165	250	325	360

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.

Source: Tsang and Klepeis, 1996.

Table 9-40. Statistics for 24-Hour Cumulative Number of Minutes Spent Outdoors on School Grounds/Playground, at a Park/Golf Course, and at a Pool/River/Lake

								Percentiles							
Category	Population Group	N	Mean	Stdev	Stderr	Min	Max	5	25	50	75	90	95	98	99
Statistics for 24-Hour Cumulative Number of Minutes Spent Outdoors on School Grounds/Playground															
Age (years)	1-4	9	85	61.084	20.36	10	175	10	30	65	140	175	175	175	175
Age (years)	5-11	64	88.016	95.638	11.96	5	625	10	30	60	120	170	220	315	625
Age (years)	12-17	76	78.658	88.179	10.12	3	570	5	25	55	105	165	225	370	570
Age (years)	18-64	101	119.812	127.563	12.69	1	690	5	30	85	165	240	360	540	555
Age (years)	> 64	7	65	47.258	17.86	5	150	5	30	60	95	150	150	150	150
Statistics for 24-Hour Cumulative Number of Minutes Spent Outdoors at a Park/Golf Course															
Age (years)	1-4	21	149.857	176.25	38.4609	21	755	25	50	85	150	360	425	755	755
Age (years)	5-11	54	207.556	184.496	25.1068	25	665	35	70	125	275	555	635	660	665
Age (years)	12-17	52	238.462	242.198	33.5869	15	1065	15	60	147.5	337.5	590	840	915	1065
Statistics for 24-Hour Cumulative Number of Minutes Spent Outdoors at a Pool/River/Lake															
Age (years)	1-4	14	250.571	177.508	47.441	90	630	90	130	167.5	370	560	630	630	630
Age (years)	5-11	29	175.448	117.875	21.889	25	390	30	60	145	293	365	375	390	390
Age (years)	12-17	22	128.318	94.389	20.124	40	420	58	60	82.5	210	225	235	420	420

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.

Source: Tsang and Klepeis, 1996.

Table 9-41. Statistics for 24-Hour Cumulative Number of Minutes Spent at Home in the Kitchen Bathroom, Bedroom, and in a Residence (All Rooms)

								Percentiles							
Category	Population Group	N	Mean	Stdev	Stderr	Min	Max	5	25	50	75	90	95	98	99
Statistics for 24-Hour Cumulative Number of Minutes Spent at Home in the Kitchen															
Age (years)	1-4	335	73.719	54.382	2.9712	5	392	15	30	60	100	140	180	225	240
Age (years)	5-11	477	60.468	52.988	2.4262	1	690	10	30	50	75	120	150	180	235
Age (years)	12-17	396	55.02	58.111	2.9202	1	450	5	15	36	65	125	155	240	340
Statistics for 24-Hour Cumulative Number of Minutes Spent in the Bathroom															
Age (years)	1-4	328	35.939	46.499	2.5675	1	600	10	15	30	40	60	75	125	270
Age (years)	5-11	490	30.9673	38.609	1.7442	1	535	5	15	27	35	52.5	60	100	200
Age (years)	12-17	445	29.0517	32.934	1.5612	1	547	5	15	20	35	60	65	90	100
Statistics for 24-Hour Cumulative Number of Minutes Spent at Home in the Bedroom															
Age (years)	1-4	488	741.988	167.051	7.562	30	1440	489	635	740	840	930	990	1095	1200
Age (years)	5-11	689	669.144	162.888	6.2055	35	1440	435	600	665	740	840	915	1065	1140
Age (years)	12-17	577	636.189	210.883	8.7792	15	1375	165	542	645	750	875	970	1040	1210
Statistics for 24-Hour Cumulative Number of Minutes Spent Indoors in a Residence (all rooms)															
Age (years)	1-4	498	1211.64	218.745	9.8022	270	1440	795	1065	1260	1410	1440	1440	1440	1440
Age (years)	5-11	700	1005.13	222.335	8.4035	190	1440	686	845	975	1165	1334	1412.5	1440	1440
Age (years)	12-17	588	969.5	241.776	9.9707	95	1440	585	811.5	950	1155	1310	1405	1440	1440

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.

Source: Tsang and Klepeis, 1996.

Table 9-42. Statistics for 24-Hour Cumulative Number of Minutes Spent Traveling Inside a Vehicle

								Percentiles							
Category	Population Group	N	Mean	Stdev	Stderr	Min	Max	5	25	50	75	90	95	98	99
Age (years)	1-4	335	68.116	75.531	4.1267	1	955	10	30	47	85	150	200	245	270
Age (years)	5-11	571	71.033	77.62	3.2483	1	900	10	25	51	90	140	171	275	360
Age (years)	12-17	500	81.53	79.8	3.5687	1	790	10	30	60	100	165.5	232.5	345	405

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.

Source: Tsang and Klepeis, 1996.

Table 9-43. Statistics for 24-Hour Cumulative Number of Minutes Spent Outdoors (outside the residence) and Outdoors Other Than Near a Residence or Vehicle, Such as Parks, Golf Courses, or Farms

								Percentiles							
Group Name	Group Code	N	Mean	Stdev	Stderr	Min	Max	5	25	50	75	90	95	98	99
Statistics for 24-Hour Cumulative Number of Minutes Spent Outdoors (outside the residence)															
Age (years)	1-4	201	195.652	163.732	11.5488	3	715	30	75	135	270	430	535	625	699
Age (years)	5-11	353	187.564	158.575	8.4401	4	1250	20	80	150	265	365	479	600	720
Age (years)	12-17	219	135.26	137.031	9.2597	1	720	5	35	100	190	300	452	545	610
Statistics for 24-Hour Cumulative Number of Minutes Spent Outdoors Other Than Near a Residence or Vehicle Such as Parks, Golf Courses, or Farms															
Age (years)	1-4	54	164.648	177.34	24.133	1	980	10	60	120	175	370	560	630	980
Age (years)	5-11	159	171.34	177.947	14.112	5	1210	15	55	115	221	405	574	660	725
Age (years)	12-17	175	156.903	174.411	13.184	5	1065	10	45	100	210	385	570	735	915

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.

Source: Tsang and Klepeis, 1996.

Table 9-44. Statistics for 24-Hour Cumulative Number of Minutes Spent in Malls, Grocery Stores, or Other Stores

								Percentiles							
Group Name	Group Code	N	Mean	Stdev	Stderr	Min	Max	5	25	50	75	90	95	98	99
Age (years)	1-4	110	90.036	77.887	7.4263	5	420	10	40	65	105	210	250	359	360
Age (years)	5-11	129	77.674	68.035	5.9901	3	320	5	30	60	110	180	225	255	280
Age (years)	12-17	140	88.714	101.361	8.5666	1	530	5	20	45	123.5	222.5	317.5	384	413

Note: "DK" = The respondent replied "don't know". Refused = Refused data. N = doer sample size. Mean = Mean 24-hour cumulative number of minutes for doers. Stdev = standard deviation. Stderr = standard error. Min = minimum number of minutes. Max = maximum number of minutes. Percentiles are the percentage of doers below or equal to a given number of minutes.

Source: Tsang and Klepeis, 1996.

Table 9-45. Statistics for 24-hour Cumulative Number of Minutes Spent with Smokers Present

Category	Population Group	N	Mean	Stdev	Stderr	Min	Max	Percentiles							
								5	25	50	75	90	95	98	99
Age (years)	1-4	155	366.56	324.46	26.062	5	1440	30	90	273	570	825	1010	1140	1305
Age (years)	5-11	224	318.07	314.02	20.981	1	1440	25	105	190	475	775	1050	1210	1250
Age (years)	12-17	256	245.77	243.61	15.226	1	1260	10	60	165	360	595	774	864	1020

Table 9-46. Range of Time (minutes) Spent Smoking Based on the Number of Respondents

	Total N	Number of Minutes											
		-	0-60	60-120	120-180	180-240	240-300	300-360	360-420	420-480	480-540	540-600	600-660
Age (years)													
1-4	499	344	29	23	14	8	10	7	8	7	8	7	5
5-11	703	479	40	38	32	23	10	9	6	12	6	11	6
12-17	589	333	75	31	30	20	22	15	13	7	13	5	3

	Number of Minutes											
	660-720	720-780	780-840	840-900	900-960	960-1020	1020-1080	1080-1140	1140-1200	1200-1260	1260-1320	1320-1380	1380-1440
Age (years)													
1-4	3	5	6	3	2	3	2	2	1	*	1	*	1
5-11	7	2	5	2	*	1	5	2	2	3	*	*	2
12-17	7	3	5	3	1	1	*	*	*	2	*	*	*

Note: * = Missing Data; DK =Don't know; N = Number of Respondents; Refused = Respondent Refused to Answer.
Source: Tsang And Klepeis, 1996.

Table 9-47. Number of Minutes Spent Smoking (minutes/day)

			Percentiles											
Category	Population Group	N	1	2	5	10	25	50	75	90	95	98	99	100
Age (years)	1-4	499	0	0	0	0	0	0	75	455	735	975	1095	1440
Age (years)	5-11	703	0	0	0	0	0	0	82	370	625	975	1140	1440
Age (years)	12-17	589	0	0	0	0	0	0	130	377	542	810	864	1260

Note: N = Doer Sample Size; Percentiles are the Percentage of Doers below or Equal to a Given Number of Minutes.
Source: Tsang and Klepeis, 1996.

Table 9-48. Gender and Age Groups

Gender-Age Group	Subgroup	n	Age Range
Adolescents	Males	98	12-17 years
	Females	85	12-17 years
Children[a]	Young males	145	6-8 years
	Young females	124	6-8 years
	Old males	156	9-11 years
	Old females	160	9-11 years

a Children under the age of 6 are excluded for the present study (too few responses in CARB study).

Source: Funk et al., 1998.

Table 9-49. Assignment of At-Home Activities to Ventilation Levels for Children

Low	Moderate
Watching child care	Outdoor cleaning
Night sleep	Food Preparation
Watch Personal care	Metal clean-up
Homework	Cleaning house
Radio use	Clothes care
TV use	Car/boat repair
Records/tapes	Home repair
Reading books	Plant care
Reading magazines	Other household
Reading newspapers	Pet care
Letters/writing	Baby care
Other leisure	Child care
Homework/watch TV	Helping/teaching
Reading/TV	Talking/reading
Reading/listen music	Indoor playing
Paperwork	Oudoor playing
	Medical child care
	Washing, hygiene
	Medical care
	Help and care
	Meals at home
	Dressing
	Visiting at home
	Hobbies
	Domestic crafts
	Art
	Music/dance/drama
	Indoor dance
	Conservations
	Painting room/home
	Building fire
	Washing/dressing
	Outdoor play
	Playing/eating
	Playing/talking
	Playing/watch TV
	TV/eating
	TV/something else
	Reading book/eating
	Read magazine/eat
	Read newspaper/eat

Source: Funk et al., 1998.

Table 9-50. Aggregate Time Spent (minutes/day) At-Home in Activity Groups by Adolescents and Children[a]

Activity Group	Adolescents		Children	
	Mean	SD	Mean	SD
Low	789	230	823	153
Moderate	197	131	241[b]	136
High	1	11	3	17
$High_{participants}$[c]	43	72	58	47

a Time spent engaging in all activities embodied by Ve category (minutes/day).
b Significantly differ from adolescents ($p < 0.05$).
c Represents time spent at-home by individuals participating in high ventilation levels.

Source: Funk et al., 1998.

Table 9-51. Comparison of Mean Time (minutes/day) Spent At-Home by Gender[a] (Adolescents)

Activity Group	Male		Female	
	Mean	SD	Mean	SD
Low	775	206	804	253
Moderate	181	126	241	134
High	2	16	0	0

Source: Funk et al., 1998.

Table 9-52. Comparison of Mean Time (minutes/day) Spent At-Home by Gender and Age for Children[a]

Activity Group	Males				Females			
	6-8 Years		9-11 Years		6-8 Years		9-11 Years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Low	806	134	860	157	828	155	803	162
Moderate	259	135	198	111	256	141	247	146
High	3	17	7	27	1	9	2	10
$High_{participants}$[c]	77	59	70	54	68	11	30	23

a Time spent engaging in all activities embodied by Ve category (minutes/day)
b Participants in high Ve activities

Source: Funk et al., 1998.

Table 9-53. Number of Person-Days/Individuals[a] for Children in CHAD[a] Database

Age Group	All Studies	California[b]	Cincinnati[c]	NHAPS-Air	NHAPS-Water
0 year	223/199	104	36/12	39	44
0-6 months		50	15/5		
6-12 months		54	21/7		
1 year	259/238	97	31/11	64	67
12-18 months		57			
18-24 months		40			
2 years	317/264	112	81/28	57	67
3 years	278/242	113	54/18	51	60
4 years	259/232	91	41/14	64	63
5 years	254/227	98	40/14	52	64
6 years	237/199	81	57/19	59	40
7 years	243/213	85	45/15	57	56
8 years	259/226	103	49/17	51	55
9 years	229/195	90	51/17	42	46
10 years	224/199	105	38/13	39	42
11 years	227/206	121	32/11	44	30
Total	3009/2640	1200	556/187	619	634

[a] CHAD - Consolidated Human Activity Database is available on U.S. EPA Intranet.
[b] The California study referred to in this table is the Wiley 1991 study.
[c] The Cincinnati study referred to in this table is the Johnson 1989 study.

The number of person-days of data are the same as the number of individuals for all studies except for the Cincinnati study. Since up to three days of activity pattern data were obtained from each participant in this study, the number of person-days of data is approximately three times the number of individuals.

Source: Hubal et al., 2000.

Table 9-54. Number of Hours Per Day Children Spend in Various Microenvironments by Age
Average ± Std. Dev. (Percent of Children Reporting >0 Hours in Microenvironment)

Age (years)	Indoors at Home	Outdoors at Home	Indoors at School	Outdoors at Park	In Vehicle
0	19.6 ± 4.3 (99%)	1.4 ± 1.5 (20%)	3.5 ± 3.7 (2%)	1.6 ± 1.5 (9%)	1.2 ± 1.0 (65%)
1	19.5 ± 4.1 (99)	1.6 ± 1.3 (35)	3.4 ± 3.8 (5)	1.9 ± 2.7 (10)	1.1 ± 0.9 (66)
2	17.8 ± 4.3 (100)	2.0 ± 1.7 (46)	6.2 ± 3.3 (9)	2.0 ± 1.7 (17)	1.2 ± 1.5 (76)
3	18.0 ± 4.2 (100)	2.1 ± 1.8 (48)	5.7 ± 2.8 (14)	1.5 ± 0.9 (17)	1.4 ± 1.9 (73)
4	17.3 ± 4.3 (100)	2.4 ± 1.8 (42)	4.9 ± 3.2 (16)	2.3 ± 1.9 (20)	1.1 ± 0.8 (78)
5	16.3 ± 4.0 (99)	2.5 ± 2.1 (52)	5.4 ± 2.5 (39)	1.6 ± 1.5 (28)	1.3 ± 1.8 (80)
6	16.0 ± 4.2 (98)	2.6 ± 2.2 (48)	5.8 ± 2.2 (34)	2.1 ± 2.4 (32)	1.1 ± 0.8 (79)
7	15.5 ± 3.9 (99)	2.6 ± 2.0 (48)	6.3 ± 1.3 (40)	1.5 ± 1.0 (28)	1.1 ± 1.1 (77)
8	15.6 ± 4.1 (99)	2.1 ± 2.5 (44)	6.2 ± 1.1 (41)	2.2 ± 2.4 (37)	1.3 ± 2.1 (82)
9	15.2 ± 4.3 (99)	2.3 ± 2.8 (49)	6.0 ± 1.5 (39)	1.7 ± 1.5 (34)	1.2 ± 1.2 (76)
10	16.0 ± 4.4 (96)	1.7 ± 1.9 (40)	5.9 ± 1.5 (39)	2.2 ± 2.3 (40)	1.1 ± 1.1 (82)
11	14.9 ± 4.6 (98)	1.9 ± 2.3 (45)	5.9 ± 1.5 (41)	2.0 ± 1.7 (44)	1.6 ± 1.9 (74)

Source: Hubal et al., 2000.

Table 9-55. Average Number of Hours Per Day Children Spend Doing Various Macroactivities *While Indoors at Home* by Age
(Percent of Children Reporting >0 Hours for Microenvironment/macroactivity)

Age (year)	Eat	Sleep or Nap	Shower or Bathe	Play Games	Watch TV or Listen to Radio	Read, Write, Homework	Think, Relax, Passive
0	1.9 (96%)	12.6 (99%)	0.4 (44%)	4.3 (29%)	1.1 (9%)	0.4 (4%)	3.3 (62%)
1	1.5 (97)	12.1 (99)	0.5 (56)	3.9 (68)	1.8 (41)	0.6 (19)	2.3 (20)
2	1.3 (92)	11.5 (100)	0.5 (53)	2.5 (59)	2.1 (69)	0.6 (27)	1.4 (18)
3	1.2 (95)	11.3 (99)	0.4 (53)	2.6 (59)	2.6 (81)	0.8 (27)	1.0 (19)
4	1.1 (93)	10.9 (100)	0.5 (52)	2.6 (54)	2.5 (82)	0.7 (31)	1.1 (17)
5	1.1 (95)	10.5 (98)	0.5 (54)	2.0 (49)	2.3 (85)	0.8 (31)	1.2 (19)
6	1.1 (94)	10.4 (98)	0.4 (49)	1.9 (35)	2.3 (82)	0.9 (38)	1.1 (14)
7	1.0 (93)	9.9 (99)	0.4 (56)	2.1 (38)	2.5 (84)	0.9 (40)	0.6 (10)
8	0.9 (91)	10.0 (96)	0.4 (51)	2.0 (35)	2.7 (83)	1.0 (45)	0.7 (7)
9	0.9 (90)	9.7 (96)	0.5 (43)	1.7 (28)	3.1 (83)	1.0 (44)	0.9 (17)
10	1.0 (86)	9.6 (94)	0.4 (43)	1.7 (38)	3.5 (79)	1.5 (47)	0.6 (10)
11	0.9 (89)	9.3 (94)	0.4 (45)	1.9 (27)	3.1 (85)	1.1 (47)	0.6 (10)

Source: Hubal et al., 2000.

Table 9-56. Confidence in Activity Patterns Recommendations

Considerations	Rationale	Rating
TIME SPENT INDOORS VS. OUTDOORS		
Study Elements		
• Level of peer review	The study received high level of peer review.	High
• Accessibility	The study is widely available to the public.	High
• Reproducibility	The reproducibility of these studies is left to question. Evidence has shown that activities have tended to shift over the past decade since the study was published, due to economic conditions and technological developments, etc. Thus, it is assumed there would be differences in reproducing these results. However, if data were reanalyzed in the same manner the results are expected to be the same.	Medium
• Focus on factor of interest	The study focused on general activity patterns.	High
• Data pertinent to US	The study focused on the U.S. population.	High
• Primary data	Data were collected via questionnaires and interviews.	High
• Currency	The studies were published in 1985 (data were collected 1981-1982).	Medium
• Adequacy of data collection period	Households were sampled 4 times during 3 month intervals from February to December, 1981.	High
• Validity of approach	A 24 hour recall time diary method was used to collect data.	High
• Study size	The sample population was 922 children between the ages of 3-17 years old.	High
• Representativeness of the population	The study focused on activities of children.	High
• Characterization of variability	Variability was characterized by age, gender, and day of the week; location of activities and various age categories for children.	Medium
• Lack of bias in study design (high rating is desirable)	Biases noted were sampled during time when children were in school (activities during vacation time are not represented); activities in the 1980's may be different than they are now;	Medium
• Measurement error	Measurement or recording error may occur since the diaries were based on recall (in most cases a 24 hour recall).	Medium
Other Elements		
• Number of studies	Two	High
• Agreement between researchers	Difficult to compare due to varying categories of activities and the unique age distributions found within each study.	Not Ranked
Overall Rating		**Medium**

Table 9-56. Confidence in Activity Patterns Recommendations (cont'd)

Considerations	Rationale	Rating
TIME SPENT SHOWERING		
Study Elements		
• Level of peer review	The study received high level of peer review.	High
• Accessibility	Currently, raw data are available to only EPA. It is not known when data will be publicly available.	Low
• Reproducibility	Results are reproducible.	High
• Focus on factor of interest	The study focused specifically focused on time spent showering.	High
• Data pertinent to US	The study focused on the U.S. general population.	High
• Primary data	The study was based on primary data.	High
• Currency	The study was published in 1996.	High
• Adequacy of data collection period	The data were collected between October 1992 and September 1994.	High
• Validity of approach	The study used a valid methodology and approach which, in addition to 24-hour diaries, collected information on temporal conditions and demographic data such as geographic location and socioeconomic status for various U.S. subgroups.	High
• Study size	Study consisted of 9,386 total participants consisting of all ages.	High
• Representativeness of the population	The data were representative of the U.S. population.	High
• Characterization of variability	The study provides a distribution on showering duration.	High
• Lack of bias in study design (high rating is desirable)	The study includes distributions for showering duration. Study is based on short-term data.	High
• Measurement error	Measurement or recording error may occur because diaries are based on 24-hour recall.	Medium
Other Elements		
• Number of studies	One; the study was a national study.	Low
• Agreement between researchers	Recommendation is based on only one study but it is a widely accepted study and average value is comparable to a second key study.	High
Overall Rating		**High**

Table 9-56. Confidence in Activity Patterns Recommendations (cont'd)

Considerations	Rationale	Rating
SHOWER FREQUENCY		
Study Elements		
• Level of peer review	The study received high level of peer review.	High
• Accessibility	Currently, raw data is available to only EPA. It is not known when data will be publicly available.	Low
• Reproducibility	Results can be reproduced or methodology can be followed and evaluated provided comparable economic and social conditions exists.	High
• Focus on factor of interest	The survey collected information on duration and frequency of selected activities and time spent in selected micro-environments.	High
• Data pertinent to US	The data represents the U.S. population	High
• Primary data	The study was based on primary data.	High
• Currency	The study was published in 1996.	High
• Adequacy of data collection period	The data were collected between October 1992 and September 1994.	High
• Validity of approach	The study used a valid methodology and approach which, in addition to 24-hour diaries, collected information on temporal conditions and demographic data such as geographic location and socioeconomic status for various U.S. subgroups. Responses were weighted according to this demographic data.	High
• Study size	The study consisted of 9,386 total participants consisting of all age groups	High
• Representativeness of the population	Studies were based on the U.S. population.	High
• Characterization of variability	The study provided data that varied across geographic region, race, gender, employment status, educational level, day of the week, seasonal conditions, and medical conditions of respondent..	High
• Lack of bias in study design (high rating is desirable)	Study is based on short term data..	Medium
• Measurement error	Measurement or recording error may occur because diaries were based on 24-hour recall.	Medium
Other Elements		
• Number of studies	One; the study was based on one, primary, national study.	Low
• Agreement between researchers	Recommendation was based on only one study.	Not Ranked
Overall Rating		**High**

Table 9-56. Confidence in Activity Patterns Recommendations (cont'd)

Considerations	Rationale	Rating
TIME SPENT SWIMMING		
Study Elements		
• Level of peer review	Study received high level of peer review.	High
• Accessibility	Currently, raw data is available to only EPA. It is not known when data will be publicly available.	Low
• Reproducibility	Results can be reproduced or methodology can be followed and evaluated provided comparable economic and social conditions exists.	High
• Focus on factor of interest	The survey collected information on duration and frequency of selected activities and time spent in selected micro-environments.	High
• Data pertinent to US	The data represents the U.S. population	High
• Primary data	The study was based on primary data.	High
• Currency	The study was published in 1996.	High
• Adequacy of data collection period	The data were collected between October 1992 and September 1994.	High
• Validity of approach	The study used a valid methodology and approach which, in addition to 24-hour diaries, collected information on temporal conditions and demographic data such as geographic location and socioeconomic status for various U.S. subgroups. Responses were weighted according to this demographic data.	High
• Study size	The study consisted of 9,386 total participants consisting of all age groups	High
• Representativeness of the population	Studies were based on the U.S. population.	High
• Characterization of variability	The study provided data that varied across geographic region, race, gender, employment status, educational level, day of the week, seasonal conditions, and medical conditions of respondent..	High
• Lack of bias in study design (high rating is desirable)	The study includes distributions for swimming duration. Study is based on short term data.	Medium
• Measurement error	Measurement or recording error may occur because diaries were based on 24-hour recall.	Medium
Other Elements		
• Number of studies	One; the study was based on one, primary, national study.	Low
• Agreement between researchers	Recommendation was based on only one study.	Not Ranked
Overall Rating		**High**

Table 9-56. Confidence in Activity Patterns Recommendations (cont'd)

Considerations	Rationale	Rating
RESIDENTIAL TIME SPENT INDOORS AND OUTDOORS		
Study Elements		
• Level of peer review	The study received high level of peer review.	High
• Accessibility	Currently, raw data is available to only EPA. It is not known when data will be publicly available.	Low
• Reproducibility	Results can be reproduced or methodology can be followed and evaluated provided comparable economic and social conditions exists.	High
• Focus on factor of interest	The survey collected information on duration and frequency of selected activities and time spent in selected micro-environments.	High
• Data pertinent to US	The data represents the U.S. population	High
• Primary data	The study was based on primary data.	High
• Currency	The study was published in 1996.	High
• Adequacy of data collection period	Data were collected between October 1992 and September 1994.	High
• Validity of approach	The study used a valid methodology and approach which, in addition to 24-hour diaries, collected information on temporal conditions and demographic data such as geographic location and socioeconomic status for various U.S. subgroups. Responses were weighted according to this demographic data.	High
• Study size	The study consisted of 9,386 total participants consisting of all age groups	High
• Representativeness of the population	The studies were based on the U.S. population.	High
• Characterization of variability	The study provided data that varied across geographic region, race, gender, employment status, educational level, day of the week, seasonal conditions, and medical conditions of respondent..	High
• Lack of bias in study design (high rating is desirable)	The study includes distribitions for time spent indoors and outdoors at ones residence. Study is based on short term data.	Medium
• Measurement error	Measurement or recording error may occur because diaries were based on 24-hour recall.	Medium
Other Elements		
• Number of studies	One; the study was based on one, primary, national study.	Low
• Agreement between researchers	Recommendation was based on only one study.	Not Ranked
Overall Rating		**High**

Table 9-56. Confidence in Activity Patterns Recommendations (cont'd)

Considerations	Rationale	Rating
TIME SPENT PLAYING ON GRASS		
Study Elements		
• Level of peer review	The study received high level of peer review.	High
• Accessibility	Currently, raw data are available to only EPA. It is not known when data will be publicly available.	Low
• Reproducibility	Results can be reproduced or methodology can be followed and evaluated provided comparable economic and social conditions exists.	High
• Focus on factor of interest	The survey collected information on duration and frequency of selected activities and time spent in selected micro-environments.	High
• Data pertinent to US	The data represents the U.S. population.	High
• Primary data	The study was based on primary data.	High
• Currency	The study was published in 1996.	High
• Adequacy of data collection period	The data were collected between October 1992 and September 1994.	High
• Validity of approach	The study used a valid methodology and approach which, in addition to 24-hour diaries, collected information on temporal conditions and demographic data such as geographic location and socioeconomic status for various U.S. subgroups. Responses were weighted according to this demographic data.	High
• Study size	The study consisted of 9,386 total participants consisting of all age groups.	High
• Representativeness of the population	The studies were based on the U.S. population.	High
• Characterization of variability	The study provided data that varied across geographic region, race, gender, employment status, educational level, day of the week, seasonal conditions, and medical conditions of respondent..	High
• Lack of bias in study design (high rating is desirable)	The study includes distributions for bathing duration. Study is based on short-term data.	Medium
• Measurement error	Measurement or recording error may occur because diaries were based on 24-hour recall.	Medium
Other Elements		
• Number of studies	One; the study was based on one, primary, national study.	Low
• Agreement between researchers	Recommendation was based on only one study.	Not Ranked
Overall Rating		**High**

Table 9-56. Confidence in Activity Patterns Recommendations (cont'd)

Considerations	Rationale	Rating
TIME SPENT PLAYING ON GRASS		
Study Elements		
• Level of peer review	The study received high level of peer review.	High
• Accessibility	Currently, raw data are available to only EPA. It is not known when data will be publicly available.	Low
• Reproducibility	Results can be reproduced or methodology can be followed and evaluated provided comparable economic and social conditions exists.	High
• Focus on factor of interest	The survey collected information on duration and frequency of selected activities and time spent in selected micro-environments.	High
• Data pertinent to US	The data represents the U.S. population.	High
• Primary data	The study was based on primary data.	High
• Currency	The study was published in 1996.	High
• Adequacy of data collection period	The data were collected between October 1992 and September 1994.	High
• Validity of approach	The study used a valid methodology and approach which, in addition to 24-hour diaries, collected information on temporal conditions and demographic data such as geographic location and socioeconomic status for various U.S. subgroups. Responses were weighted according to this demographic data.	High
• Study size	The study consisted of 9,386 total participants consisting of all age groups.	High
• Representativeness of the population	The studies were based on the U.S. population.	High
• Characterization of variability	The study provided data that varied across geographic region, race, gender, employment status, educational level, day of the week, seasonal conditions, and medical conditions of respondent..	High
• Lack of bias in study design (high rating is desirable)	The study includes distributions for bathing duration. Study is based on short-term data.	Medium
• Measurement error	Measurement or recording error may occur because diaries were based on 24-hour recall.	Medium
Other Elements		
• Number of studies	One; the study was based on one, primary, national study.	Low
• Agreement between researchers	Recommendation was based on only one study.	Not Ranked
Overall Rating		**High**

Table 9-57. Summary of Activity Pattern Studies

Summary of Activity Patterns Studies				
Study	Age Groups (yrs)	Sample Size	Population	Activities
Timmer (1985)	3-5, 6-8, 9-11, 12-14, 15-17	922	National	18 microenvironments
Robinson & Thomas (1991)	12-adults	1,762 (California) 2,762 (national)	California and national	16 microenvironments
Wiley (1991)	0-2, 3-5, 6-8, 9-11	1,200	California	10 microenvironments
Davis (1995)	10-60 (months)	92	Washington State	Activities grouped into indoors and outdoors
Tsang & Kleipeis (1996)	1-4, 5-11, 12-17	Varies with age groups and activities	U.S. national	23 microenvironments
Funk (1998)	6-11, 12-17	768	California	Activities grouped into low, medium, and high ventilation levels
Hubal (2000)	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	2,640	Based on Wiley (1991), Johnson (1989), and Tsang & Kleipeis (1996)	Activities grouped into indoors at home, indoors at school, outdoors at home, outdoors at part, and in vehicle

Table 9-58. Summary of Mean Time Spent Indoors and Outdoors from Several Studies

Age (years)	Time Indoors (hours/day)[1]	Time Outdoors (hours/day)[1]	Study
3-5	19	2.8	Timmer 1985
6-8	20	2.2	
9-11	20	1.8	
12-14	20	1.8	
15-17	19	1.9	
12 and older	21 (national) 21 (California)	1.2 (national 1.4 (California)	Robinson and Thomas 1991
0-2	20	4	Wiley 1991
3-5	18.8	5.2	
6-8	19.7	4.4	
9-11	19.9	4.1	

[1] Mean of weekday and weekend rounded up to two significant figures.

Table 9-59. Summary of Recommended Values for Activity Factors

Type	Value	Study
Time Indoors	Ages 3-5 years (19 hours/day) Ages 6-14 years (20 hours/day) Ages 12-17 years (19 hours/day)	Timmer et al., 1985
Time Outdoors	Ages 3-5 years (2.8 hours/day) Ages 6-8 years (2.2 hours/day) Ages 9-14 years (1.8 hours/day) Ages 15-17 years (1.9 hours/day)	
Taking Showers	10 min/day shower duration 1 shower event/day	Tsang and Klepeis, 1996 Tsang and Klepeis, 1996
Swimming	1 event/month 60 minutes/event	Tsang and Klepeis, 1996
Residential		Tsang and Klepeis, 1996
Indoors	18 hr/day	
Outdoors	2 hr/day	
Playing on Sand or Gravel	60 min/day	Tsang and Klepeis, 1996
Playing on Grass	60 min/day	Tsang and Klepeis, 1996